COTTON

FEBRUARY, 1914

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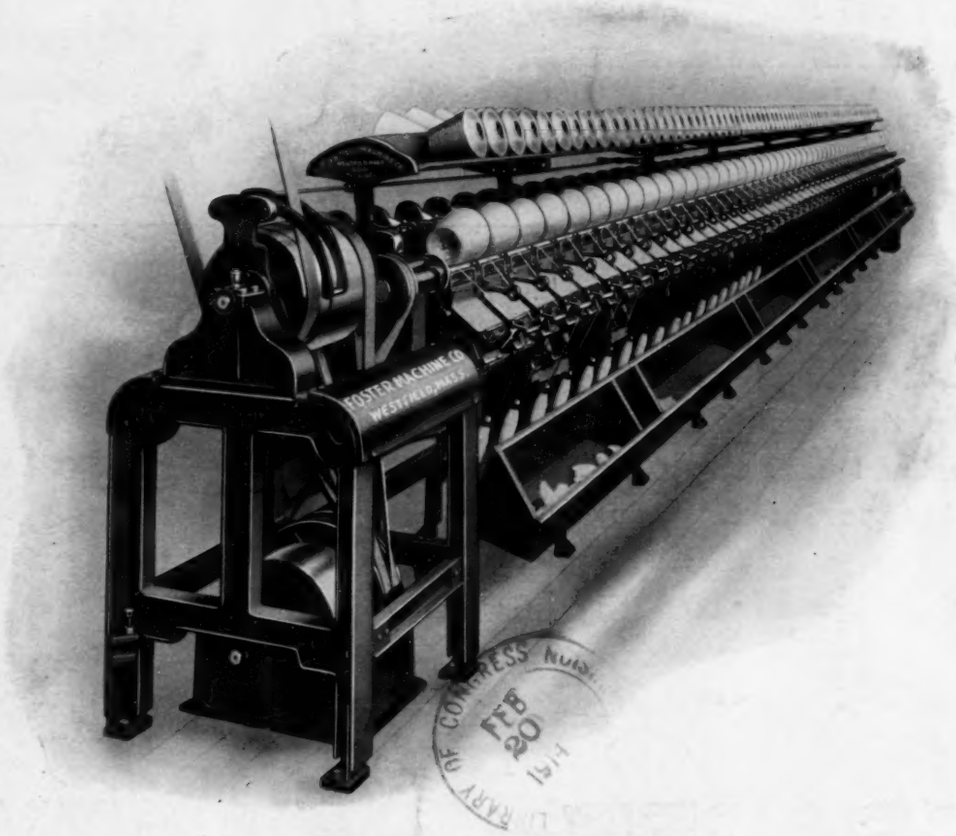

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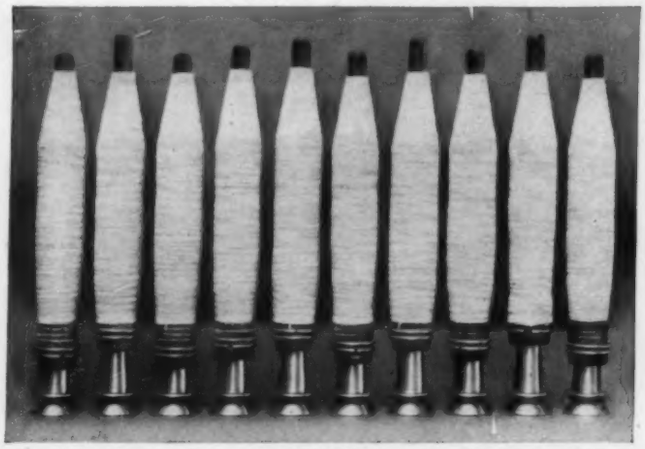

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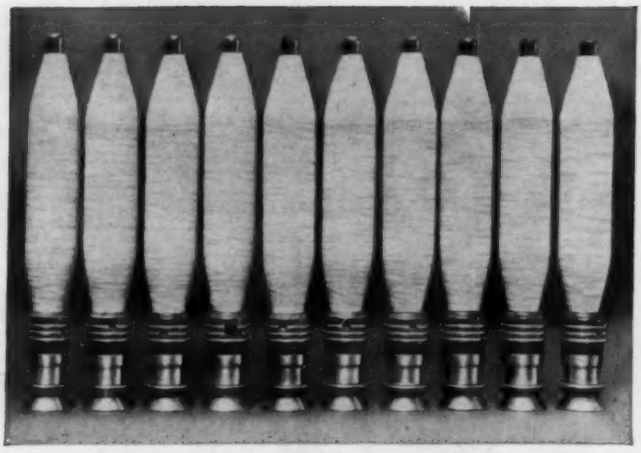

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CLASS LEGISLATION AGAIN.

The passage by Congress last year of the sundry civil appropriation bill with the Roddenbery rider, which was later approved by the President, prohibited the use of certain public funds appropriated to enforce the Sherman act to prosecute organizations of laboring men or farmers which might commit acts in violation thereof. This vicious precedent, which deprives the government of the means with which to enforce the Sherman act, has been eclipsed by the present Bartlett-Bacon bill, which destroys the law itself.

The bill in question is H. R. 1873 and S. 927, being identical measures, introduced for passage by the two distinguished Georgia lawyers and statesmen from whom it derives its name. We reproduce the bill herewith for the benefit of those of our readers who are not familiar with its form:

H. R. 1873; S. 927.

A bill to make lawful certain agreements between employers and laborers, and persons engaged in agriculture or horticulture, and to limit the issuing of injunctions in certain cases, and for other purposes.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That it shall not be unlawful for persons employed or seeking employment to enter into any arrangements, agreements, or combinations with the view of lessening the hours of labor, or of increasing their wages, or of bettering their condition; nor shall any arrangements, agreements, or combinations be unlawful among persons engaged in horticulture or agriculture when made with the view of enhancing the price of agricultural or horticultural products; and no restraining order or injunction shall be granted by any court of the United States, or by any judge thereof, in any case between an employer and employee, or between employers and employees, or between persons employed and persons seeking employment, or involving or growing out of a dispute concerning terms or conditions of employment in any case, or concerning any agreement, arrangement, or combination of persons engaged in horticulture or agriculture with the view of enhancing prices as aforesaid, or any act or acts done in pursuance thereof, unless in either case said injunction be necessary to prevent irreparable injury to property or to a property right of the party making the application for which there is no adequate remedy at law; and such property or property right must be particularly described in the application, which must be sworn to by the applicant or by his agent or attorney.

In construing this act the right to enter into the relation of employer and employee, to change that relation and to assume and create a new relation of employer and employee, and to perform and carry on business in such rela-

tion with any person in any place, or do work and labor as an employee, shall be held and construed to be a personal and not a property right. In all cases involving the violation of the contract of employment by either the employee or employer where no irreparable damage is about to be committed upon the property or property right of either, no injunction shall be granted, but the parties shall be left to their remedy at law.

Section 2. That no person or persons who are employed or seeking employment or other labor shall be indicted, prosecuted, or tried in any court of the United States for entering into any arrangements, agreements, or combinations between themselves as such employees or laborers, made with a view of lessening the number of hours of labor or increasing their wages or bettering their condition or for any act done in pursuance thereof, unless said act is in itself unlawful; nor shall any person or persons who may enter into any arrangements or agreements or combinations among themselves for the purpose of engaging in horticulture or agriculture with a view of enhancing the price of agricultural or horticultural products, be indicted, prosecuted, or tried in any court of the United States on account of making or entering into such arrangements, agreements, or combinations, or any act done in pursuance thereof, unless said act is in itself unlawful.

The fact that this bill is so worded as to include persons engaged in horticulture and agriculture not only acts as a cloak to partially hide the union labor trend of the measure, but in itself allows cotton planters to "enter into any arrangements, agreements, or combinations with the view of lessening the hours of labor, etc., * * * nor shall any arrangements, agreements, or combinations be unlawful among persons engaged in horticulture or agriculture when made with a view of enhancing the price of agricultural or horticultural products."

This paragraph seems to tell the cotton planter frankly that he may form combinations at will, so long as the result to be attained is the increased price of cotton or other agricultural product. It also means, if it means anything at all, that a combination or union of laboring men formed for the purpose of "lessening the hours of labor or of increasing their wages, or of bettering their condition," is not to be found criminally or civilly liable, no matter by what means it endeavors to better the condition of its members. Further, "no injunction shall be granted" in such cases unless "irreparable damage is about to be committed upon the property or property right" of the person seeking the injunction.

A final assurance of immunity from criminal or civil responsibility is given in the last section of the bill, although it would seem that such further assurances were needless in view of the earlier clauses. Such vicious class legislation should receive the active denunciation of every civic organization, and every responsible manufacturer should send a letter of protest to his senator and congressman against the unfair treatment he is receiving therein. Such efforts may be classed as an "insidious lobby," but it is right in line with the Federation of Labor, which endorsed this measure in its conventions of 1912 and 1913, instructed its executive committee to procure its immediate enactment without change, and, through that committee, has presented these demands to the President and Congress, and by circular appeal directed the organization of committees to wait upon senators and congressmen in each state during the holidays and urged the sending of individual letters to representatives demanding the immediate passage of this measure without alterations. However, such methods of lobbying on the part of labor unions cannot be called insidious, inasmuch as they are publicly holding a club of votes suspended over the heads of the luckless congressmen, and this club is given added political strength by the inclusion of farmers' organizations within the privileges of this nefarious Bartlett-Bacon bill.

GOVERNMENT COMMERCIAL AGENTS.

The commercial agent, his work and its results have been much before the public of late, largely because of current press reports indicating that the attitude of Secretary Redfield was rather in favor of the discontinuance of this service, especially on textile lines. This is due largely to a mistaken impression that the results of these investigations are not appreciated by cotton manufacturers.

Early in January a number of the members of the Georgia Cotton Manufacturers' Association had the pleasure of meeting one of these commercial agents in the person of Mr. R. M. Odell, who delivered an interesting and instructive address in Atlanta and exhibited several hundred samples of cloths which he had collected on his travels. Mr. Odell had already explained his mission to the manufacturers of North and South Carolina, and the adoption of sets of resolutions by all these state associations, thanking the Department of Commerce for the privilege of having Mr. Odell personally explain the conditions obtaining abroad, and urging the continuance of this service, sets at rest the absurd rumor of a lack of interest. Moreover, President Gordon of the Georgia Association, personally and publicly requested that COTTON print the address of Mr. Odell in full for the benefit of those members of the association who were unable to be present.

It is to be very much regretted that the meagre equipment of the Bureau of Foreign and Domestic Commerce for the handling and printing of these commercial agents' reports causes so much delay in their preparation and distribution, as the material would have a much greater news and statistical value if sent out immediately on its receipt than it does when a period of several months elapse between its collection and distribution. Not only should the service of the commercial agents be continued on textile lines, but, if possible, the bureau facilities should be increased to handle such reports with greater promptness and dispatch. At the present time, just as the new tariff law is getting well under way, it will be extremely unfortunate to have this valuable service withdrawn, because now, as never before, cotton manufacturers all over the country are realizing that they must leave no stone unturned in order to meet the promised competition in various lines, and that any market, however distant, will be of value to them in the disposal of excess production.

In his Atlanta address Commercial Agent Odell discussed the pertinent facts about cotton goods trade conditions in foreign countries aggregating over four million square miles, with a population of fifty-four million, and with a present cotton goods import capacity of more than eighty-eight million dollars. He emphasized the insignificant part of this trade that now reaches American cotton manufacturers from many of these countries, and aptly

illustrated with samples many of the opportunities now open. In sending Mr. Odell on this speaking tour the Department of Commerce conferred a great favor upon the textile manufacturers of the country.

CHILD LABOR LAWS.

The following editorial comments by *Fibre and Fabric* on the report of the Massachusetts legislative committee which has been investigating the Massachusetts child labor law should be carefully studied by legislators who have been induced to commit themselves in favor of other private bills of a like character for introduction at the next session of their respective legislatures:

"The majority reports that a further trial be given before the law is changed, and a minority report asks for a change whereby a boy or girl between the ages of 14 and 16 years can work the legal week if they successfully pass a health examination.

"The new law which went into effect last September works particular hardship to families of textile mill workers. This shows in the statistics gathered by the committee. In New Bedford 779, or 39 per cent, of the young operatives were thrown out of work. The average wage of these workers was $4 at the lowest, and at least $3,000 a week is taken from the working families in that city. The suffering caused by this shrinkage in family income cannot be realized, but it is a big dividend on the interference by the reformers and idle rich.

"In Lowell, out of 1,194 employed before the law went into effect, 743 were discharged. In Fall River 566 were driven out of employment; and in Lawrence, out of 823 employed prior to September 1, 651 were discharged. In the four leading Massachusetts mill centers 2,729 boys and girls were forced out of work, and it is safe to say that in this number less than 29 could be classed as physically unfit to work.

"At the average of $4 each per week, mill families were cut off from a cash income of nearly $11,000 weekly, and there was new worry on the part of parents on account of their children being on the street to a dangerous extent.

"What has been gained other than in theory is difficult to see. The home is represented seriously in the loss of wages earned by the young workers. The well-to-do and rich reformers behind the paid agitators stirring up this child labor question have no realization of what a loss of $4 or $8 each week means to the working families, nor do they appreciate the dangers the boys and girls are facing during their idle periods.

"In the mills they were learning a trade, and they were also forced to recognize system and order in their work, and that alone would have had valuable bearing on their future usefulness as citizens. They have been driven out at a most critical period in their careers, and for no good reason.

"The legislature can remedy the matter by changing the law, and we hope the good sense of the legislators will not permit the arguments of the reformers to lead them astray. Let us have laws forcing Massachusetts boys and girls to work. Give them a medical certificate all right and 99 per cent will pass the test. Stop breeding socialism and anarchy by this continual interference in the domestic affairs of the working people, and give them the credit due, of having ability to regulate their own affairs."

ANNUAL CONVENTION OF THE GEORGIA COTTON MANUFACTURERS' ASSOCIATION.

The annual convention of the Georgia Cotton Manufacturers' Association, which is to be held at Atlanta, Ga., on the 8th and 9th of May, will no doubt be a repetition of the interesting and instructive meeting held at Columbus in 1913.

While it is still too early to give any definite outline of the program to be rendered on this occasion, it may be stated in a tentative way that this program will probably be about as follows: Address of welcome on behalf of the city of Atlanta and the Atlanta mills; a response to the address of welcome by some prominent member of the association; the annual report of the president, F. B. Gordon, of Columbus, Ga.; an address by the Hon. Stuart W. Cramer, of Charlotte, N. C., president of the American Cotton Manufacturers' Association; an address on some technical subject to be announced later; general discussion by members; appointment of special committees, and any other business which may seem pertinent to the first session of the convention.

The second session of the convention will probably include the report of the secretary and treasurer, Harry L. Williams, of Columbus, Ga.; the reports of the various standing and special committees; the selection of the next convention city; the report of the nominating committee, and the election of officers.

On this subject of the election of officers there is considerable food for thought for the members of the association, inasmuch as President Gordon states definitely that he will decline to serve another term as president at the present time. A number of members of the association, in discussing this subject, have suggested Allen F. Johnson, president of the Exposition Cotton Mills, of Atlanta, as their choice for the next president of the association. Mr. Johnson is a very popular member of the association and already holds the office of vice-president, and is also a member of the executive committee as well as a member of the tariff committee.

The entertainment features of the program are under the personal charge of Clyde L. King, president of the Georgia Cotton Mills, of Griffin, who was instrumental in bringing the association to Atlanta for its annual convention this year. Every mill in Georgia converting cotton should have a representative present at this convention. This is an important business consideration and should receive prompt attention.

The following figures show the quantities and value of the imports of cotton goods into the port of Mombasa for the fiscal years ended March 31, 1912 and 1913, according to the annual report of the chief of customs of the East Africa Protectorate:

	1911-12		1912-13	
Articles.	Yards.	Value.	Yards.	Value.
Bleached..	3,224,792	$ 241,719	3,658,105	$ 297,903
Unbl'chd..	16,829,020	986,961	22,400,424	1,308,777
Printed...	1,511,553	148,477	2,348,813	203,390
Dyed.....	2,953,140	329,486	2,967,751	338,095
Blankets..	1,611,576	214,238	2,873,472	393,758
Total..	26,130,081	$1,920,881	34,248,565	$2,541,923

GEORGIA COTTON MANUFACTURERS' ASSOCIATION.

On Saturday, January 3d, the members of the Georgia Cotton Manufacturers' Association were given an opportunity to learn of the wonderful possibilities of Africa and the Red Sea district as a consumer of cotton textiles, when, through the courtesy of the Secretary of Commerce, Commercial Agent Ralph M. Odell exhibited at the rooms of the Atlanta Chamber of Commerce, over 300 samples of cloths collected during his travels, and delivered an informal address, describing the conditions in the various countries visited.

President Mell R. Wilkinson, of the Chamber of Commerce, called the meeting to order and introduced President F. B. Gordon, of the Cotton Manufacturers' Association, who presided. Following the address of Mr. Odell, which appears in full on another page, he answered many questions propounded by the manufacturers, who evinced much interest in the many cloth samples and their history.

The Chamber of Commerce then tendered a luncheon at the Piedmont Hotel in honor of Mr. Odell and the Cotton Manufacturers' Association, after which Mr. Odell was induced to follow up his earlier talk on trade prospects with interesting personal experiences and anecdotes of travel.

President Gordon, of the Cotton Manufacturers' Association, then arose and expressed the thanks of the members to Mr. Odell for his interesting talk and called upon a previously appointed committee to present the formal resolutions. These resolutions were as follows:

At a meeting of the Cotton Manufacturers' Association of Georgia, held in Atlanta on January 3d, 1914, under the auspices of the Atlanta Chamber of Commerce, the following resolutions were unanimously adopted:

Resolved: Whereas we have listened with great interest and profit to the address of Mr. R. M. Odell, Special Agent of the Bureau of Foreign and Domestic Commerce, of the Department of Commerce of the United States, and have examined with unusual interest the many samples of cloth which he had on exhibition from Africa, Arabia and Abyssinia,

Be it resolved: First, that we wish to thank the Department of Commerce upon the intelligent and thorough manner in which they are pursuing the investigation of conditions as to the export trade in textiles, especially in lines which may be of future benefit to the mills of this country. We wish to commend this effort on the part of the Secretary of Commerce and also wish to urge with all earnestness that he will continue the employment of such special agents, wherever the prospects for future American trade may be developed.

Resolved: Second, that the members of the Cotton Manufacturers' Association of Georgia wish to deny that there is any lack of interest on their part in the work now being done by the Department of Commerce in sending out these special agents to foreign countries, and that the reports made by such special agents are read by many of our members with great interest and benefit. We would strongly urge, however, that such reports be more promptly printed as when the publication is delayed for several months, the information given is often too old to be of practical benefit. We would further urge the department to issue these publications free of cost to manufacturers or others equally interested, as in our opinion their value is such as to warrant free distribution on the part of the department.

Be it further resolved: That a copy of these resolutions be mailed to the Secretary of Commerce by the Secretary of the Cotton Manufacturers' Association of Georgia, duly certified to by the officers of this association and also by the officers of the Atlanta Chamber of Commerce. We also wish to hereby express our thanks to the Secretary of Commerce for allowing us the privilege of having Mr. Odell with us on this occasion.

(Signed) E. W. SWIFT, Chairman.
ALLEN JOHNSON,
L. L. ARNOLD,
Committee on Resolutions.

On behalf of the Chamber of Commerce, President Wilkinson offered to cooperate with the Georgia Association in promoting foreign exports and to assist in any way possible to secure tangible results from the visit of Mr. Odell.

A called meeting of the Executive Committee of the Georgia Cotton Manufacturers' Association was held at the offices of President S. A. Carter, of the Gate City Cotton Mills, just prior to the meeting at the Chamber of Commerce. The regular business of the committee was transacted and the following committee on baling and tare appointed by President F. B. Gordon: Oscar Elsas, President of the Fulton Bag & Cotton Mills, Atlanta; S. A. Carter, President of the Gate City Cotton Mills, Atlanta, and Clyde L. King, President of the Georgia Cotton Mills, at Griffin, Ga. Arrangements are being perfected for an interesting program for the annual convention next June.

In commenting on the distribution among countries of origin of the unbleached cotton textiles received at the port of Mombasa, the chief of customs observes that the outstanding feature is the serious shrinkage from the United Kingdom. The demand is for a cheaper and coarser article from the United States than is at present placed on the market by the Manchester mills. The average value of gray goods imported from the United States works out at 2⅝d. ($0.054⅛) per yard, while that of the United Kingdom works out at 3d. ($0.061) per yard. For this reason the United States greatly predominates in the cotton trade, though Lancashire is at present second to no country in the world as regards spinning and weaving.

Italy has gained the third place instead of the fourth in the previous year. The average price of the Italian manufactures which are coming to the front works out at 2¾d. ($0,056) per yard. Here again the inferior quality turned out is better suited to the local market.

Gray sheetings mostly in demand are made up in pieces 30 yards by 36 inches and weigh from 5½ pounds to 8½ pounds per piece.

The extent and resources of the territory and the large native population, which is likely, under European influence, to increase its demands for textiles, offer promising conditions for still greater development of the import trade in cotton textiles.

The arrangement committee of the Southern Textile Association announce June 12th and 13th as the date of the Association's mid-summer convention at the Isle of Palms. Make your plans now to be present.

TRADE OPPORTUNITIES IN AFRICA.

Address of Commercial Agent Ralph M. Odell, of the Bureau of Foreign and Domestic Commerce, Washington, D. C., Before the Cotton Manufacturers' Association of Georgia on the Present and Future Prospects for Cotton Goods Export.

I feel a natural hesitancy in giving information or offering suggestions to a body of men who have been engaged in cotton manufacturing, and perhaps in export trade, for many years, but it is the earnest hope of the Department of Commerce and of myself that I may be able to shed some new light on an old subject because of the opportunities which I have had for observing at first-hand the conditions which prevail in the foreign markets which I have visited. The Secretary of Commerce, has, therefore, proposed to have me visit a number of the textile centers throughout the country in order that I may get in touch with you and discuss in an informal way the possibilities of increasing our trade in cotton goods.

There is, unquestionably, a sound reason for an optimistic view of the future of American cotton goods export trade. During the fiscal year ending June 30th, 1913, the total exports of all kinds of cotton manufactures from the United States amounted in value to over $53,000,000, and exceeded the exports of any other year in the history of the country. It is true that the exports of piece goods showed a rapid decline following the years 1905-1906, owing to the loss of considerable trade in China. It is worthy to note, however, that during the past five years our exports of cotton piece goods have steadily grown, amounting in value to over $30,000,000, in the fiscal year 1913, as compared with $21,000,000, in 1909, an increase of over 30 per cent. It is a fact that is probably not generally known that not even England showed a similar increase during a like period. My investigations during the past few years have led to a firm conviction that there are enormous possibilities for a further expansion of this trade if we will seriously set ourselves to the task and widen the range of fabrics which we offer to the foreign buyer in accordance with the requirements and conditions of the markets where the goods are absorbed.

RALPH M. ODELL, COMMERCIAL AGENT.

It is manifestly impossible in a short talk to give a detailed analysis of the trade in the many countries which I have visited in the past year, and I shall only point out the salient features and striking characteristics in each market, in the hope that I may be able to arouse greater interest in the possibilities which they present, for the sale of our goods. In the reports which I have forwarded from time to time, and which can be obtained at a nominal cost from the Bureau of Foreign and Domestic Commerce at Washington, I have endeavored to present a clear picture of the conditions as I have found them, and to suggest means for increasing our trade. I want to assure you that it has at all times been my serious purpose to conduct the work along as practical lines as possible, and to this end I hope that each of you will question me on any points on which you may desire information and which I may not bring out in the course of my remarks. This work which the government has undertaken in behalf of the textile industry of the country can only be made of real value in proportion as the manufacturers themselves show their interest in it and avail themselves of the opportunity which it offers of giving them first-hand information in regard to the markets abroad in which they are seeking an outlet for their products.

The first country I visited on the trip from which I have just returned was Syria. This is one of the richest sections of the Turkish empire, and is a large purchaser of cotton goods. We have only an insignificant share of this trade, which amounts in value to over $10,000,000 annually. Our failure to sell to Syria has been due to the fact that we do not make the class of goods in demand there. Grey goods are mainly T cloths, which have a woven colored head-end in each piece, and other heavily sized goods. The printed shirtings and flannels which have a large sale in Syria, do not conform to similar fabrics which we manufacture. We sell some grey sheetings and drills in this country, but before we can hope to secure an appreciable amount of the trade we must supply the kind of goods which make up the great bulk of the imports. It must be admitted, however, that no serious effort has been made by American manufacturers to introduce our lines, and if travelers should be sent out with full lines of samples, if fairly liberal terms could be offered to the reliable importers in the two chief cities of Bierut and Aleppo, our trade would undoubtedly increase. In view of the fact that my report on the Syrian market has already been published and copies of it are now available, it seems unnecessary to dwell at length on the possibilities which this country may offer for the sale of American cotton goods. The samples which are on exhibition here today will give you a clear idea of the goods which are now in demand. The recent war in the Near East has resulted in a large influx of population into Asiatic Turkey and the

market is certainly worthy of the study and attention of American cotton manufacturers.

Egypt and the Sudan, with cotton goods imports of over $25,000,000, annually, and which are increasing these imports very rapidly, also offer opportunities for American trade development, if we will make the goods which the people require. So little known are American goods in these markets that I encountered several merchants who professed their ignorance of the fact that there was a cotton textile industry in the United States and grey cloth is largely called "Manchester goods." In Egypt, bleached shirtings, prints, piece dyed goods and T cloth, in the order named, are the principal lines sold and 80 per cent of them are imported from England, with smaller quantities from Italy, Austria, and other continental countries. In the Sudan, grey sheetings predominate and conditions are fairly favorable for the sale of American goods. As it is a comparatively new country, there are very few reliable firms and a considerable amount of the trade is through Egypt, but direct trade is increasing and it is highly desirable that we enter the field before the goods of other countries become too strongly entrenched in the market.

After leaving the Sudan I spent some time in Aden, which is the principal distribution point for the trade of the Red Sea district, amounting in value to over $4,000,000 annually. Here the character of the trade is radically different from that of Turkey, the Levant and Egypt, and from this point down to the Portugese possessions in East Africa, American goods are popular and we have a considerable share of the trade. It was particularly interesting to see in many of the shops numerous grey sheetings that were manufactured in the South, mostly in North and South Carolina, Georgia and Alabama. Our supremacy in this district is due partly to the fact that we were early in the field and that American brands are well known and are demanded by the natives. The grey goods sold are more purely sized than those used in Turkey and this is another important factor which has contributed to our success in this market. In the past three years the imports of American grey goods into Aden have nearly doubled in value. Our principal competitors are India and Italy, but the native buyer generally prefers the American article because of its superiority and he will buy it as long as the margin of the price between it and other goods is not too great. A fairly large quantity of the grey goods imported is dyed in native establishments and it is claimed that American goods, because they are free from heavy sizing, are best suited for this purpose. For a time our position as a principal supplier of grey goods in this market was seriously threatened by Italian grey cloth, but the natives discovered the inferiority of the latter and turned again to the American. More recently, however, the Italian manufacturers have been shipping out better qualities and there is a rather general practice of imitating American brands, in order to make the native believe he is getting the genuine American cloth.

The grey sheetings sold in the Red Sea district are mostly 36 inches wide, 40 by 36 to 48 by 52 construction, and the weights are 3.25, 3.50, 3.75, 3.90, 4.00 and 4.70 yard goods. The bales are packed 25 pieces of 30 yards each. Grey drills are taken in fairly large quantities, the 30 inch, 2.85, 3.00 and 3.25 yard lines being the most popular. They are put up in 40 yard pieces with 15 pieces to the bale. Italy is our chief competitor in these goods and in order to show the extent to which the American brands are being imitated, I secured a sample of an Italian drill, which I have with me here, and on which the stamping is strikingly similar to the brand of a very popular drill from the United States.

In addition to the grey sheetings and drills there are numerous other goods sold in the Red Sea markets, such as bleached shirtings, the so-called "kikoys" which are a variety of grey sheetings with wide colored borders and headings, white dhooties, tanjibs, mulls, prints, Turkey red shirtings and several varieties of woven colored goods knowns as sarongs, chaders and lungis, which are used principally by the Indian population. The natives in these countries appear to prefer to clothe themselves in gaily colored garments when they can afford it. My observations of conditions and tendencies lead me to the firm conviction that the economic progress of the countries in the Red Sea district and the consequent increase in the purchasing power of the people is likely to expand the demand for colored and bleached goods. American manufacturers have heretofore practically confined themselves to the grey piece goods trade, and if we expect to continue to predominate in this market, it is well-nigh imperative that we widen the range of our fabrics in order to participate in the trade in those lines in which, up to the present time, we have had no share and have shown little interest, but which already make up over 30 per cent of the total imports in the aggregate.

Although Aden is the principal trans-shipping and distributing center in the Red Sea District, Abysinnia is the most important consuming market for the goods which are imported there, and I, therefore, made a trip into the interior of that country. Lack of transportation facilities, the fact that it is completely shut in from the sea, and with somewhat unstable political conditions have retarded the progress of Abysinnia, but rich agricultural and other natural resources, the gradual opening up of the country to trade and the civilizing influences of the West are causing a slow, but steady development. Nowhere is this more apparent than in the increasing consumption of cotton fabrics. The lines sold are practically the same as those which are imported at Aden. 36 inch, 3.00, 3.25 and 3.50 yard grey sheetings (called "aboujedid" locally) are the most important weights in demand and by far the bulk of them come from the United States. There are no satisfactory statistics but the grey goods imports via Jibuti in French Somaliland, which is the chief port of entry and the terminus of a railway which is gradually being extended to Adis Abeba, the capital of Abysinnia, amounted to nearly $2,000,000 in the year 1912, as compared with a little over $1,000,000 in 1909, and the merchants whom I interviewed stated that over 50 per cent of these goods were American. Bleached and colored goods make up about 30 per cent of the total imports of the cotton manufactures. Although about 60 per cent of the trade at the present is via Aden, there is a strong tendency among the importers and merchants toward direct connection with Europe and America for the purchase and sale of merchandise and Jibuti is one port in this district which threatens the supremacy of Aden. The dealers claim that it is a loss of time and money to import via Aden where trans-shipment is necessary. A number of steamers plying between France, Germany and England and the Far East and East Africa now make Jibuti a port of call and direct trade is undoubtedly on the increase. Several cotton goods firms with branches in Manchester or in Europe who have established themselves in Jibuti and the important cities in Abysinnia, are doing a direct trade without importing their supplies via Aden and

it will be well for American manufacturers to watch very closely the changing conditions of the trade if they expect to meet the competition which threatens our present supremacy in this market.

During a period of three months, which I spent in East Africa, including British and German East Africa, Uganda and Zanzibar, I had an opportunity to investigate a cotton goods trade valued at over $7,000,000, annually, and which has nearly doubled in the past three years. Grey goods, known locally as "Americanci" and consisting chiefly of sheetings 36 inches wide, weighing from 3.25 to 6.15 yards per pound, make up more than half the total, and, as many of you know, we have for a long time dominated this trade as we have in the Red Sea district. During the year ending June 30, 1913, we exported unbleached goods to British East Africa, to the value of $796,000, as compared with $330,000, in the fiscal year 1909. The conditions in these countries are very similar to those obtaining in the Red Sea district. The native always prefers American grey sheeting and he is willing to pay slightly more to get it but when the margin of the difference in the price of American and European goods becomes very wide, there is an increased demand for the latter.

The prices are governed mainly by the American quotations, and the stocks on hand, and the time of purchase. Frequently one importer may be able to sell a 3.50 or 4.00 yard sheeting at a lower price than his competitor because he made his contracts on a weak market. At the time I was in Africa (April, May and June, 1912) 3.50 yard American goods were being bought at 6½ cents per yard, landed at Mombasa, without duty, which is 10 per cent *ad valorem;* the corresponding price for 3.00 yard goods was 5¾ cents and for 5.00 yard goods, 5 cents.

England's share of the grey goods trade is insignificant and our chief competitors are India and Italy. India's goods are much inferior to the American and are only sold to a certain class of people, who demand a cheap article without regard to quality. Moreover, a part of the grey goods credited to India are not grey sheetings in the ordinary meaning of that term, but are the so-called "chadders" a grey sheeting in pieces of 8 to 10 yards, with grey corded or narrow colored stripes, grey tanjibs and other special lines.

The Italian manufacturers, however, are really beginning to encroach on the monopoly we have hitherto held in the grey goods trade. For example, the imports of Italian grey goods into British East Africa, during the year ending March 31, 1913 were valued at $212,000, as compared with less than $75,000 in the year immediately preceding. The quality of these goods is superior to those which are sold so largely in Turkey and the markets of the Near East, being more lightly sized, but they are not yet as purely sized as the American goods and are usually made of a somewhat lower grade of cotton. I also discovered that many of the Italian grey sheetings were being shipped out in pieces of 28 to 29 yards with 30 laps, or folds instead of 30 yards, the standard length of American goods. There is also considerable imitation of our brands which have been established in the country for years. The Italians are aided in their efforts to capture our trade by several Italian firms which have branches in many of the important trading centers and by reason of the fact that for more than a year there has been a direct line of steamers with monthly sailings from Genoa and Naples to Mombasa, which call at intermediate ports in the Italian possessions in Africa.

As in the Red Sea district, our own trade is confined to grey sheetings and drills and a few bleached drills. We have no appreciable share in supplying the white shirtings, printed and colored goods and blankets, which come mostly from England, Holland and Germany, and which are imported into all the East African markets, to the value of over $1,000,000, annually. A description of these goods would be superfluous in view of the fact that I have with me a large number of samples showing the most important lines.

While up tothe present time we have had a larger share of the total trade than any other country, we may find it difficult to hold this position unless we set about to broaden the lines of goods which we can supply. The development and increasing prosperity of these countries is

EAST AFRICAN WOMEN IN NATIVE DRESS. NO HOBBLE SKIRT HERE.

likely to cause a greater expansion in the consumption of bleached and colored goods. It should be emphasized that this is a rapidly expanding market and those who are earliest in the field will thereby be in a better position to hold this trade. It would be much easier to get our line of goods introduced now than later and the history of trade in East Africa is a striking indication of what can be done by American manufacturers if they will set about seriously to capture a share of the business in lines which they have hitherto left untouched.

At the risk of referring to a time-worn subject and one which is frequently exaggerated in importance, I feel that my remarks on the trade of East Africa would be incomplete if I failed to draw your attention to the criticisms that I heard among the dealers as to the condition in which American goods frequently reach their destination. Unquestionably, the packing of American goods shipped to

East Africa is not what is should be considering the long distance they must go, and unless improved upon it may later prove a serious menace to our trade. The dealer who receives one bale of cloth which has been damaged through insecure packing may not complain, he may accept several such bales without protest, but in time he is likely to become dissatisfied and turn to another quarter for his purchases, if he can possibly get what he wants there. I was watching the unloading of a steamer from Europe in an East African port one afternoon, and I observed 25 bales of American sheetings that were being brought out of the hold of the ship, six of which had the burlap ends practically torn entirely off and four others had lost several of the ropes that had been used for strapping and were almost on the point of losing their outside coverings. At the same time some German cotton goods were being unloaded and every bale was securely wrapped with a good quality of heavy burlap, bound with broad iron bands and strips of wood were placed under each band at the point where it turned at right angles in order to distribute the pressure and prevent the bands from cutting through the burlap. The contrast between the two lots of goods, one from America and the other from Germany was most striking.

It should be remembered that American cotton goods shipped to East Africa are subjected to much more wear and tear than those which come from Europe, and instead of being more lightly packed, the bales should be stronger and more secure than the latter in order to come through intact. All goods from the United States must be transshipped once and sometimes twice before reaching Mombassa. There are no piers at the latter port nor at Kilindini, the other harbor near by, and the bales must be lifted out of the hold of the vessel and dumped in a hurried and careless manner into a lighter or sail boat. After landing they must be carried on a dray or on the backs of natives who are inclined to handle them very roughly, to the warehouse of the importer or of the government. Also, most of the goods imported are reshipped to the interior to Uganda, or to ports of German East Africa on Lake Victoria Nyanza, which necessitates additional handling on the railway and lake steamers. In the rainy season there is also danger of damage from water. English and continental bales are usually lined with oilcloth or waterproof paper, but American goods have only a very thin paper lining and seldom more than 7½ or 8 oz. burlap as compared with 12 oz. burlap that is mainly used on bales coming from other countries.

The marking of American bales is also far from what it should be and often the marks are so indistinct that it is difficult for the importer to identify them when they arrive or when he desires to get a certain bale out of the warehouse. The chief fault is that too small letters are used and they become easily blurred. The remedy is an easy one and lies in the use of larger stencils and a good quality of ink. German bales are usually marked with letters or figures 5 or 6 inches long while those on American bales are seldom more than 2 inches. I was told by one of the importers that American bleached drills are often damaged either through the breaking of the case, in which they are always packed, or owing to the fact that the case is too large for its contents. The bleached drills are usually packed 20 pieces in a single tier, but there is often five or six inches of space between the top of the case and the top of the pile. The moving of the cloth back and forth when it is being handled sometimes causes the case to break or else the pieces are badly wrinkled and given an unattractive appearance because of the "play" they have in the case.

The actual complaints with regard to the packing of American cotton goods are not numerous yet, but I am assured that trouble would be likely to arise on this score if steps were not taken to remedy the existing defects along the lines suggested. The exercise of a little care in the sewing, strapping and marking of the bales and the expenditure of a few cents on each bale for heavier burlap would absolutely remove all grounds for complaint and forestall any trouble in the future. It must not be supposed that our competitors have quietly given over the grey goods trade to American manufacturers. On the contrary, they are striving constantly to secure a stronger foothold in the market and they are likely to point out the defects in our methods of packing and the damage to the goods which naturally results to the detriment of American trade and to the encouragement of their own.

I believe that Africa, with a population larger than that of North and South America combined, presents greater possibilities for the development of the cotton goods trade than any other continent in the world. It must be remembered that there are millions of the natives who still go about unclothed, but who are gradually beginning to adopt some style of dress as the light of civilization is being brought into the jungles and wilds of the dark continent. In this connection I think it will be interesting to quote from the annual report of the Director of Customs of British East Africa, in which he says:

"The trade in cotton goods is still in its infancy. British East Africa has a population of more than three million natives, most of whom until quite recently, went about unclothed. The majority still adhere to their primaeval customs in the matter of clothing, the Kavirondo tribe, numbering over one million, being the most conservative in this respect. The wealth of the native tribes is, however, increasing year by year and it is only to be expected that enhanced prosperity coupled with the spread of civilization will in a short time engender a desire to adopt a state of life similar to that of other human beings; in fact, the Kikuyus have already begun to purchase cotton goods and are becoming alive to the fact that they possess the wherewithal to obtain what they require, whether it be blankets, wraps, or more elaborate clothing. The present trade is bound to expand enormously in a few years time."

The entire cotton goods trade of the Red Sea and East African markets, aggregates over $15,000,000, annually. It is a trade, too, which is particularly inviting to the cotton manufacturers in the United States because American grey goods, except in the Sudan, are well known and popular. It will doubtless be a surprise to some of you to learn that the United States has such a relatively large share of the trade of a country so far removed as British East Africa, and that this trade has grown steadily in spite of distance and lack of direct means of transportation. This should act as an incentive to American manufacturers to redouble their efforts to exploit this market for the sale of their products. It is a market which is full of promise for the future, because the rapid development of the agricultural resources of the country which is taking place and is bound to widen the demands of the people and enhance the buying power of the natives, while the opening of new branch lines as feeders to the Uganda Railway, the construction of a railroad in German East Africa, improved means of transportation and shipping facilities, the making of new

roads to outlying districts rich in produce and the establishment of several industries will undoubtedly stimulate the economic and social progress of the country and a still further increase in the volume of exports and imports. Nothing short of active and persistent efforts will enable American manufacturers to retain the important position which they have long held in the market, however, and it behooves them to meet the competition of European goods by steadily maintaining their qualities, by endeavoring whenever possible to stop the imitation of their brands, and by employing the most economical selling and marketing methods consistent with efficiency and the proper extension of their foreign trade.

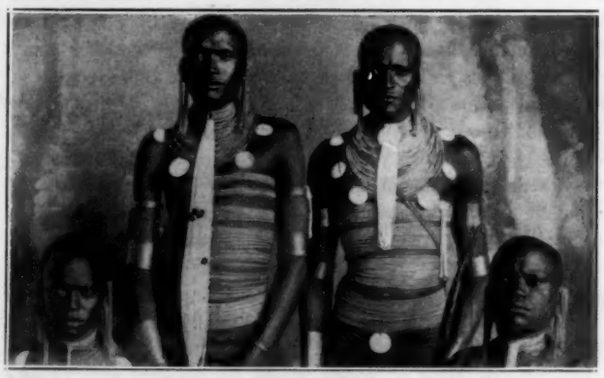
I feel that I have already transgressed too much on your time and I will conclude my remarks by pointing out as briefly as possible the principal features of the trade in South Africa where I spent several months. This is a market to which we have never given serious attention although it ranks first among the countries on the whole continent in the value of cotton manufactures imported. These imports reached the large sum of $36,000,000 in 1912, of which the most important items were apparel, valued at $13,600,000; piece goods, $8,500,000; haberdashery, $6,800,000; and underwear, blankets and rugs, $5,000,000. Of the piece goods we supplied only $34,000 worth and our share in the total trade was but $400,000. There is a 3 per cent preference in the tariff (which is 15 per cent *ad valorem* on cotton goods) in favor of England, but in spite of this, the manufacturers of Italy, Germany, Belgium and France are getting an increasing amount of the trade and they are doing this by sending out travelers with full lines of samples, securing live agents and by giving active and constant attention to the possibilities of the market. We are at no disadvantage on account of distance or freight charges, as

A NATIVE PARADE IN GERMAN EAST AFRICA, WHERE CONSIDERABLE QUANTITIES OF AMERICAN GREY CLOTH IS USED.

there are two or three steamers each month from New York to South African ports with a rate on cotton goods of about $11.00 to $12.00 per ton of 40 cu. ft. The corresponding rate from England is less than $1.00 per ton lower.

The principal lines of piece goods sold in South Africa in the order of their importance are prints, solid color goods, such as flannels, Turkey red calico, denims, khaki, blue drills, cashmeretts, sateens and colored nainsook; bleached goods and woven colored goods, consisting mainly of oxford shirtings, zephyrs, ginghams, striped drills and fancy cloths. Among the natives there is a considerable trade in blankets and rugs. Grey goods are not imported in large quantities, the total in 1912 being valued at less than $400,000. Those which I saw on the market vary in widths from 26 to 36 inches, with the principal demand for 30 or 32 inch goods. In construction from 40 by 40 to 76 by 76 picks per inch and in weight from 3.00 to 5.00 yards per pound. The cheaper goods are rather heavily sized, but the finer qualities have a soft sateen finish. The goods which America has supplied are mostly duck, denims, cottonades and indigo stripes and checks. We have no share in the very large trade in prints, partly because no serious attempt has been made to introduce them, but mainly because our goods do not conform in width, construction, design and finish to those which are in demand. I have collected numerous samples to show the qualities and patterns required and I hope that some of our printing establishments may undertake the supply of similar goods.

There are four distinct classes of people in South Africa, viz: the natives or blacks, Indians, Dutch and English, each with their own peculiar tastes. Consequently, the cotton goods trade is more diversified than that of any other



NATIVES OF UGANDA. AT PRESENT THE PRINCIPAL CLOTHING OF BOTH SEXES IS TELEGRAPH WIRE. ONE OF THE EXCELLENT MARKETS FOR THE INTRODUCTION OF TEXTILES.

country in Africa. The total area of British South Africa is over 1,000,000 square miles, or a territory equal in size to all that part of the United States lying east of the Mississippi, with the addition of Texas, Louisiana and Arkansas. The country is rather sparsely settled, however, and the total population is only 8,000,000, or less than that of New York State. Of this population, only one and a half millions are whites, the balance being colored races and Indians. The kinds of cloth in demand, therefore, vary widely and range from cheap, coarse goods used by the natives, to fancy dress fabrics that are in demand by the upper classes in the large towns and which do not differ greatly from those sold in the best dry goods stores in the United States.

England supplies nearly 80 per cent of the total cotton manufactures imported. She has been strongly entrenched in the trade for many years and her monopoly has been secured partly through a preference of 3 per cent in the tariff, partly through excellent transportation facilities with South Africa, and partly through the natural ties which bind the colony to the mother country. Practically every large importing dealer there maintains his own buying house in London, which is often in charge of a partner in the firm. Purchases, however, are made from the Continent when the article offered and the price is attractive, and there is much less conservatism than formerly.

There are many broad minded importers in South Africa who are willing to buy in any market in the world, if there is a possibility of introducing or handling the particular

line of goods on a profitable basis. Some evidence of this attitude on the part of the importers is found in the fairly large and growing trade in Germany, particularly in piece goods, haberdashery, millinery, apparel, hosiery and underwear. Americans have succeeded in selling considerable quantities of overalls, cheap cotton shirtings and underwear. The trade in South Africa in any one particular line of cotton goods is hardly large enough to make it worth while for the American manufacturer to send out a traveler regularly, but travelers who carry several lines could probably secure a fair amount of business if the goods conformed to the requirements of the trade and the prices were not too high. Certain lines could also be sold by getting in touch with a few of the large importers but in addition to providing goods that can be sold, it would be necessary to give every facility for carrying on the business. The large importer, as a rule, is naturally inclined to make his purchases in England, where he has established connections, and he will not care to buy foreign goods if any serious difficulties are put in his way, except in the case of a certain special line which he cannot obtain in England or in which there is a particularly good chance for profit. Probably the best way in which to introduce American cotton goods into this market would be to have an established resident agent who could call on the importers and dealers and constantly push the sale of the goods. Some of the agents who represent English and Continental firms frequently have several men under them and they cover the whole country. Several lines are usually handled because travel in South Africa is very expensive and the commissions on one class of goods would not be sufficient to pay the agent's expenses. Care should be used in selecting a good, reliable agent who is in close touch with the trade and is prepared to use every effort to secure orders. He should be supplied with a large number of samples attractively gotten up, and all reasonable requests for changing patterns, widths, finish and qualities should be granted if possible.

There is every reason to believe that certain lines of American cotton goods could be sold in South Africa, but it will require very serious efforts and an energetic campaign because they are practically unknown in the country. When I showed samples of American prints to several of the large importers they stated that their quality and price were entirely satisfactory but that the widths and finish did not conform to those which are in demand in this market. The city trade requires prints of 30 to 32 inches, while the widths of those sold to the natives and Dutch are chiefly 27 to 28 inches and the manufacturer who seriously hopes to introduce his lines successfully in the country must be prepared to furnish the widths desired.

As has already been stated, the wide diversity and the great number of the lines of cotton piece goods sold here does not make the South African market one which would appeal to the average American manufacturer. The comparatively small population and the inability or disinclination of the natives to purchase clothing, also make it an unattractive field for the sale of American goods. But it is a market that is latent with possibilities and the processes of development which are now going on are sure to be reflected in a considerable increase in the purchase and consumption of cotton cloth and other articles of clothing. The new generation of Dutch people is much more inclined to spend money and not to hoard it as their fathers did, while the natives, through contact with the whites and European civilization, are beginning to wear clothing in increasing numbers. It is upon these two sources, the Dutch and natives, who make up the great mass of the consuming public in the country, that the expansion in the trade of South Africa depends, and the steady increase which has taken place in the past few years is an indication of the future possibilities of the cotton goods trade. South Africa is not, and probably will never be, an important industrial country, and certainly it is not likely that cotton manufacturing will be undertaken in the near future. It is a market, therefore, which is worthy of the attention and study of the cotton goods manufacturer in the United States who is seeking an outlet abroad for his products.

In the general trade of the Union of South Africa in 1912 the United States ranked first among the strictly foreign countries in supplying the people with their requirements, coming after England and for the first time we exceed Germany in the imports. The value of our trade has grown from $9,500,000, in 1907, to $15,735,000, in 1912, or more than 55 per cent. The principal articles which South Africa purchases from the United States are oils, agricultural and mining machinery, timber, lumber, motor cars, hardware, boots and shoes, electrical machinery, furniture, carriages and carts, typewriters and cash registers, tools and miscellaneous iron and steel products. The success of the American automobile has been phenomenal and the imports have risen in value from $81,000 in 1906 to over $700,000 in 1912. I have called your attention for a moment to our important position in the general trade in order to show that there are no inherent obstacles to the development of our commercial relations with South Africa and I am firmly convinced that good results would be obtained by our cotton manufacturers and exporters if they would persistently and assiduously set themselves to the task of securing a share of the very large and important cotton goods trade of that country.

MODERN METHODS OF LIGHTING.

BY ALBERT L. PEARSON, ELECTRICAL ENGINEER FOR LOCKWOOD, GREENE AND COMPANY.

There are two principal forms of electric lamps, arc and incandescent, of which there are several types of each.

ARC	INCANDESCENT
Open carbon	Carbon
Enclosed carbon	Tantalum
Intensified carbon	Tungsten
Flame	
Mercury	
Luminous or Magnetite.	

There are a great many systems of arc lighting in use today, and some of them quite satisfactory. The open carbon arc used with high voltage constant direct current generators, has been displaced in general by the enclosed carbon arc operated in multiple on low voltage direct or alternating current circuits. The intensified carbon arc is doubtless the best of this series and due to its design the principal objections to the other types of arcs are practically overcome, that is the "traveling" of the arc around the crater causing varying shadows and the change in position of the arc relative to reflectors, thus interfering with the working of any well planned scheme.

Flame arcs are not generally used indoors except in

*Extracts from a paper read before the A. S. M. E.

foundries, machine shops with very high roofs or similar places. The light is very penetrating, thus making the lamp an excellent one for smoky places.

The mercury arc is finding a place in machine shops and textile plants, meeting with great favor in the silk industry. The principal objection to this lamp is the color of the light—a cold green.

This lamp possesses two distinct advantages—great diffusion of the light, due in a large measure to the fact that it emanates from a line rather than a point and the line distinction or clearness with which threads or lines may be distinguished.

I believe that it has been proven that this light does not produce injurious effects upon the eye. The following statement is taken from a report on tests made by C. H. Williams, M. D., and Dr. Louis Bell, upon a number of persons who have worked in the light of this lamp:

"In comparing all the cases examined, the fact which stands out most distinctly is that in no case does a careful ophthalmoscopic examination show signs of trouble with the optic nerve or retina which cannot be more properly attributed to other causes. In no case was an pathological change found in the crystalline lens or the transparent media of the eye, not even where there have been years of work under the most trying conditions possible, where the men were day after day facing the glare of scores of lighted mercury-vapor tubes on the racks of the testing room. Immediately after leaving work under the mercury lamp, color fatigue was clearly observable, as was to be expected. This fatigue is merely temporary, and was least noticeable in some of the cases who had worked longest under the light, as if the eye had acquired a certain degree of immunity to the unusual stimulus."

A fluorescent reflector is being developed which is intended to supply the missing red rays to a certain extent, and thus make the light more natural. A new form of this lamp is being developed in the quartz tube, which will compete with flame arcs.

The luminous, or magnetic arc, is not used indoors. This is replacing carbon arcs for street lighting and is used only on constant direct current systems.

Of the incandescent class, the tungsten lamp is the most efficient, 1.25 watts per candlepower as against 3.6 watts for the carbon lamp. The tantalum lamp falls about midway between these two for efficiency, 2.0 watts per candlepower. In its present high state of development, the tungsten lamp is practically free from early defects. This lamp works equally well on alternating or direct current, while the tantalum lamp gives best service on direct current. Alternating current produces the effect of repeated blows and the filament breaks in a short time, higher frequencies having worse effect than low. This lamp, therefore, should not be used on alternating systems.

In addition to its efficiency, the quality of light from the tungsten lamp is superior to that of other illuminants of this class, most nearly approaching the ideal. This lamp is the greatest competitor of the mercury arc, or Cooper-Hewitt lamp, and is being adopted as the standard of best practice for incandescent systems.

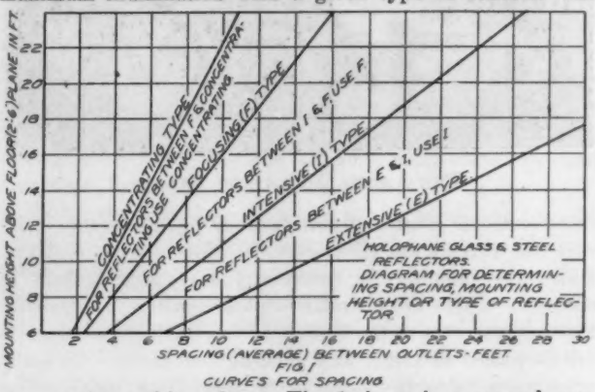
It is only during the past few years that attention and careful study have been given to the proper arrangement of lighting systems. There are, however, a number of fundamental principals which should always be followed in making a layout. As the operative is the one for whom the light is provided, he should be given every consideration. Lamps hung low down which can be adjusted by the operative should be avoided wherever possible. Not only is he liable to experiment with the lamp and waste time, but he may interfere with the work of other operatives.

Lamps should be arranged to give uniform illumination at the working plane, avoiding shadows as far as possible and particular attention should be given to the requirements of each machine.

White walls and ceilings are advantageous, and add to the effectiveness of the lighting systems. With individual driving of machines it is possible to keep the rooms cleaner than with mechanical or group driving, thus benefiting the lighting system.

On account of the glare, low exposed units should be avoided. In places where it is necessary to have the lamps low down, reflectors which will entirely conceal the filaments should be used. In such cases it is usually necessary to provide lamps close to the ceiling for lighting shafting, etc., and to overcome the effect of light and darkness.

The position of lamps should be carefully determined, both as to spacing and mounting height. In general, the height of the lamp above the floor should be such that with the spacing available the lines representing the angles of maximum illumination with a given type of reflector will


MOUNTING HEIGHT ABOVE FLOOR (2'-6" PLANE IN FT.
22
20
18
16
14
12
10
8
6
2 4 6 8 10 12 14 16 18 20 22 24 26 28 30
SPACING (AVERAGE) BETWEEN OUTLETS - FEET
CONCENTRATING TYPE FOR REFLECTORS BETWEEN F & CONCENTRATING
FOCUSING (c) TYPE FOR REFLECTORS BETWEEN I & F USE F
INTENSIVE (i) TYPE FOR REFLECTORS BETWEEN E & I USE I
EXTENSIVE (E) TYPE
HOLOPHANE GLASS & STEEL REFLECTORS. DIAGRAM FOR DETERMINING SPACING, MOUNTING HEIGHT OR TYPE OF REFLECTOR
FIG. 1
CURVES FOR SPACING

cross at the working plane. Fig. 1 shows in a general way the relation of the mounting height spacing and types of reflectors to be used.

Each problem must be considered by itself. A system of illumination which works out well in one case may be anything but what is best suited for another. The amount of light and arrangement of lamps depend upon the nature of the work and character of the machines.

In places where very good light is not required or where it is used for comparatively short periods of time, it does not pay to invest as much for this part of the equipment as in places where it is required for long periods, or is depended upon for quality of work.

Lighting systems cannot be worked out as formerly—so many watts or candlepower per square foot—but a study must be made of conditions so as to produce a layout which will prove economical and bring forth results.

The distributing system should be carefully worked out in order to secure good voltage regulation. Circuits and switches should be arranged with respect to different processes in such a way as to eliminate the use of power for lighting in sections not in use.

On low frequency alternating current systems small incandescent lamps should be avoided as much as possible, on account of flicker, which is more troublesome with the higher efficiency lamps.

A COMMUNISTIC TEXTILE PLANT.

(Contributed Exclusively to COTTON.)

BY J. S. WOODHOUSE.

"Amana blue prints," which are a staple of cotton texture throughout the middle west, come from one of the most unique cotton mills in the world. As implied by the name, they come from Amana, Iowa, which is an odd communistic society of 1,750 people owning 16,222 acres of land, that has existed since 1849. There are here three textile mills, two woolen and one cotton, valued at $100,000, with a capacity of 3,000 yards daily and an annual output valued at $325,964.

These mills were built to give employment to the members of the community, but the demand for their production became so great that outside labor was necessary. And here the workers are given every comfort and convenience. Under the rules of the community everything is held in common. There are no salaries paid community members; they are partners in the success of the whole. The machinery is placed in large, airy, well-lighted rooms. In every room is a table to which is brought from the common kitchen cake and coffee in the middle of the forenoon and the afternoon. A short recess from work being taken for refreshments.

THE AMANA MILLS AND CANAL.

Originally, to secure power for the mills, the Community men dug a big water canal seven miles to the Iowa river.

A WEAVE ROOM. NOTE THE LUNCH STOVE BACK OF THE POST.

A GENERAL VIEW OF THE VILLAGE IN WINTER.

But increased demand for power has caused them to install supplemental steam power. The cloth for clothes for the 1,750 members of the community is made here, where both men and women work. The raw material is imported—cotton from the South and wool from Texas, Colorado and Australia.

While every comfort is provided, little is done for decoration. The mills are painted neither inside nor out. This is in conformity with the rule to paint no buildings, it being considered poor economy.

The Amana people are conscientious workers and every possible pain is taken to produce quality in their textiles. The very fact that they are organized and incorporated in a community of interests because of religious motives and have no aspirations to amass worldly goods beyond their bare necessities, is the reason they do not strive to build up a great commercial field for their output. They make merely enough to keep their people busy. There is a greater demand for their staples than they can supply. Every yard of Amana cloth represents the very best quality and workmanship that honest and conscientious men and women can put into it.

TWO AMANA GIRLS.

These odd people originally came from Germany and in the community this language is spoken entirely.

The total mill consumption of cotton for the year 1913 is placed at 21,542,000 bales. The United States, with 5,786,000 bales, leads all other countries; United Kingdom, 4,440,000 bales, second; Germany, with 1,800,000 bales, third.

THE INDUSTRIAL TRUCK AS A FACTOR IN THE EFFICIENT HANDLING OF INTERNAL FREIGHT.*

BY W. W. WHITE, OF THE GENERAL VEHICLE CO.

The word "industrial" as applied to the electric truck represents, in a broad sense, a classification rather than a type, since there are many special applications of what is called the freight truck. I would place under the heading of "industrial trucks" the battery truck crane, the freight truck, the baggage truck and certain types of tractors, all electrically propelled. Each type has its special fitness for certain kinds of work, the freight truck in particular being very elastic in the range of services performed, and elastic also in the special equipment which may be added to it, such as hand-winches, small hoists, booms, etc.

The battery truck crane, the baggage truck and the electric tractor might be called refinements of the simple freight truck, their functions varying somewhat in each case. The applications of the first mentioned vehicle may be divided into three classes—hoisting, hoisting and carrying on the hook, towing trailers. The industrial tractor is slowly filling the need for a trackless engine capable of towing trailers of various types.

The simple industrial or freight truck is built in sizes and capacities suitable for moving loads on piers, in freight sheds, warehouses and industrial establishments generally. Its clearance and radius of action permit it to pass through congested places, going forward or backward with ease and facility, and it is capable of ascending gradients of 10 to 25 per cent. In a warehouse or store it can carry its load from floor to floor, wherever wanted, with a degree of celerity otherwise impossible. In the factory it carries materials direct to the place where needed and at the precise time when needed—something impossible with moving apparatus working on a fixed track—and at the same time does it more quickly and more economically than can be done with the use of hand trucks.

The capacity of such trucks is usually 2,000 pounds, that having been found the practical limit for trucks capable of the widest range of action. The size and style suitable for a particular business always depends on the working conditions. For the great majority of cases, however, the truck of 2,000 pounds capacity is ample. Few hand trucks are required to carry this much, and when they are they require several men to pull or push them. The loading space of the 2,000-pound type is roughly 28 square feet, while the total area required for movement is but 34 square feet; in other words, they have an extreme width of 4 feet and an extreme length of 8 feet. Hence it is that where a hand truck can go the industrial truck can go, while the latter can overcome grades that are impossible for hand-operated trucks.

The driver standing erect on the end of the truck, with hands on the controller and steering lever, respectively, and foot on the brake pedal, is in the best possible position to guide and control his load. The simplicity of operation does away with the necessity for hiring expensive operators. The average freight handler, colored or white, being taught to successfully operate same, even in congested plants or terminals, in about forty-eight hours.

Long before we had the motor truck it was very evident that something was wrong with the horse method of trucking, but few of us realized to what extent the power wagon was to figure in a general shake-up of trackless transportation methods. When we were provided with something which established a standard of comparison, we began to see why the horse was inefficient, and now that we have something against which to weigh the hand truck, we see its inefficiency.

Freight congestion at docks and freight terminals is caused by cramped quarters, old-fashioned methods, absence of proper schedules, and lost motion due to these conditions. It is all very well to talk about longer piers and larger terminals, but these in many cases are physical if not financial, impossibilities. We must work with what floor areas we have for the present, and by bringing efficient methods to bear upon the handling of such merchandise, endeavor to relieve the pressure until such time as fundamentally improved conditions are made possible.

This condition finds a parallel at the freight terminals of some of our railroads in at least the larger cities, and to a lesser degree in many of our large industrial plants where the hand truck—that relic of bygone efficiency—is still practically the only method of moving a five-pound box of salt, a case of shoes, a piano or a two-ton casting. The industrial railroad, the inclined elevator and the gravity conveyor are all helpful and practical under certain conditions, but relatively few have been placed in service, and in many cases they are not sufficiently elastic to meet major requirements.

It is this general condition of affairs which has brought about the successful development of the electric industrial truck and enabled it to demonstrate its economic value. The truck is sufficiently elastic to meet the needs of steamship piers, railroads and industrial plants of many kinds. We thought at first it might not pay in hauls of less than 1,000 feet, but this idea has been dissipated most conclusively. Like its predecessor, the electric motor truck, it will pay almost anywhere if you keep it busy. In many cases it has been found both possible and practical to give it a load going and coming, and under these conditions its economies (in reality, its earnings) are phenomenal.

Some railroad and steamship companies find use for from six to thirty in one terminal or pier, while several industrial plants use four, eight and twelve each. As about 75 per cent of the 300,000 railroad and steamship freight handlers probably push hand trucks, and as said hand trucks can unquestionably be reduced on a four-to-one basis by an electric industrial truck of the proper type, to 55,000, the possible economies in the internal handling of freight by common carriers become apparent, even if the figures do stagger one at first glance. (Industrial plants are not considered in above figures.)

Thirty-seven carriers and firms are now using 208 G. V. freight trucks of the 2,000-pound type, and 25 per cent of these are undoubtedly test machines. That is, they represent initial orders where a steamship company, a lighterage firm or a manufacturing plant has placed one in service with a view to determining the feasibility of discarding hand trucks entirely, and in some cases substituting inclines for freight elevators; moving goods direct from car to

*Read before the Electric Vehicle Association of America.

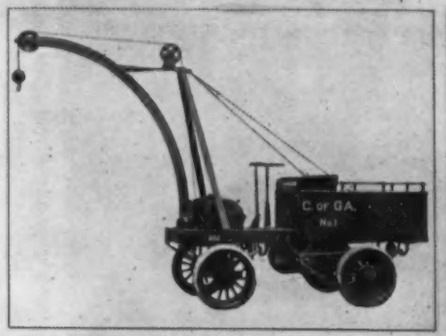


Fig. 1, 2,000 lb. Battery Truck Crane with Long Crane

Fig. 2. A 2,000 lb. Crane Truck Handling Heavy Castings

Fig. 3. "Automatic" Storage Battery Freight Truck

Fig. 4. "Automatic" Truck, Baggage Type, Carrying Mail

Fig. 5. "Buckwalter" Truck, Moving Baggage

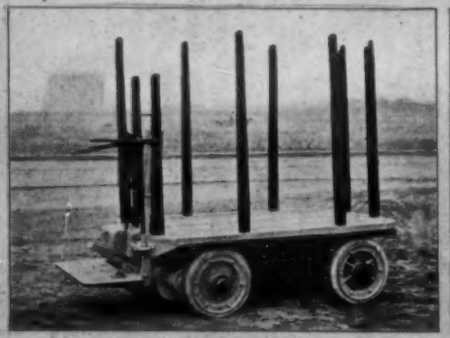


Fig. 6. G. V. Freight Truck, 2,000 lb. Type, with Two Motors

Fig. 7. Emphasizing congestion at a Dock having no up to date receiving platform and no "Electric Stevedores"

Fig. 8. Two trucks used by Mallory Steamship Company

Fig. 9. Study this picture in connection with the two following: The start of a G. V. 5 ton

Fig. 10. The same 5 ton Truck backed up to this receiving platform (at the Fall River Line)

Fig. 11. Part of the same load shown in figure No. 9, on its way to the steamer

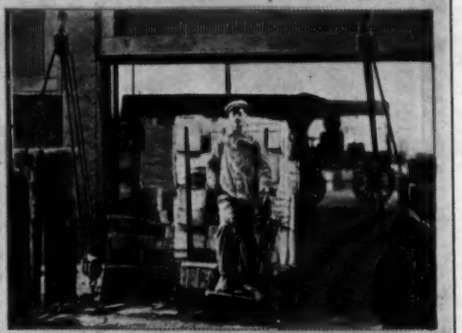


Fig. 12. Climbing the 25% grade

SOME OF THE MANY USES FOR THE INDUSTRIAL TRUCK.

warehouse, and vice versa, by means of the small electric; transporting raw material over a planked or paved route in the mill yard as against trucking it with horses. The uncertain labor factor in the big cotton ports will eventually be steadied by the use of such trucks. They are already being called electric stevedores.

It is obviously too early to determine to the last cent just how much can be saved by the adoption and use of these small trucks. The labor item is the most important one, and we have found that where the trucks can be kept busy and the hauls average 200 to 800 feet, that each truck will displace at least four and often five or six men. The twenty-one trucks used on the Fall River Line pier are credited with a saving in labor alone of $63 per day, or a total of $18,900 per year. "In addition to this saving," says *Commercial Vehicle*, "the economy item effected by these vehicles—economy to both the steamship companies and the merchants who ship in its vessels—is incalculable." If a machine will pay for itself in six months, what does it matter whether it costs $1,000 or $5,000?

In moving heavy units, such as drums, casks of oil, heavy bales and cases, the truck will do the work of five or six hand trucks, and, even when it has to wind about teams and standing freight, it will deliver its load in about one-third the time consumed by hand trucks, which frequently block themselves in the narrow, sinuous aisles. On Pier 14 four men required thirty minutes to unload thirty-eight bags of cement and transport them a distance of 500 feet. By means of the electric, two men required but seventeen minutes to unload seventy similar bags and transport them 1,500 feet into the hold of the vessel.

In Ambler, Pa., the general superintendent of an asbestos, slate and sheathing company states that "there have been days when we have moved as much as 1,000 tons of material with the first truck purchased, resulting in a net saving to us in labor of sixteen men." This result was obtained by operating practically twenty-four hours with two interchangeable batteries.

The various railroads using these trucks are not disposed at present to indicate what economies are made possible by their use, but the fact that they continue to add to their equipment of same would indicate general satisfaction. The truck used in hauling coal is a happy solution of one mill yard or fuel problem. One small truck used in Montreal is equipped with a hand winch for warping on heavy coils of wire, while still another truck in another city has joined the fire prevention corps, being equipped with hose and fire extinguishers and ready to move quickly to any part of the floor.

No less than twelve of these machines are used by one textile plant in New England, chiefly for carrying rolls of print cloth from the storehouse to the printing machines, and for carrying dye tubs from the color room to the machines, empties forming the return load. (See Fig. 17.)

The little machine shown in Fig. 18 carries seven beams per trip in another big mill. With two men it will deliver six full beams and return with six empties in eleven minutes. It formerly took fifty-five minutes to do this same work. The six beams weigh about 1,900 pounds. Imagine

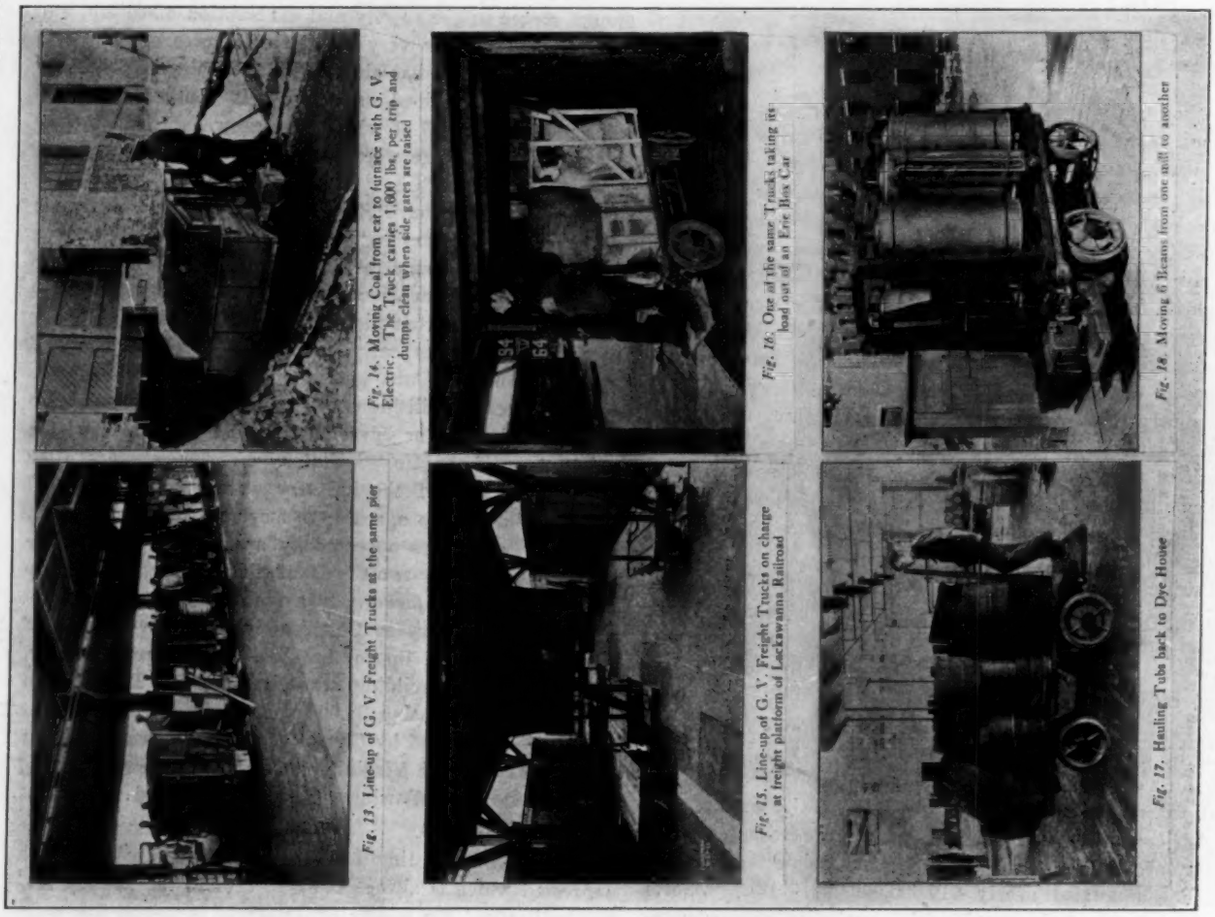


Fig. 14. Moving Coal from car to furnace with G. V. Electric. The Truck carries 1,600 lbs. per trip and dumps clean when side gates are raised

Fig. 16. One of the same Trucks taking its load out of an Erie Box Car

Fig. 18. Moving 6 Beams from one mill to another

Fig. 13. Line-up of G. V. Freight Trucks at the same pier

Fig. 15. Line-up of G. V. Freight Trucks on charge at freight platform of Lackawanna Railroad

Fig. 17. Hauling Tubs back to Dye House

AND A FEW MORE.

what a truck would save in moving the great rolls of paper consigned to newspapers if some method of getting them direct from mill to car and from car to wagon on motor truck could be devised! Such names as Boston Belting Company, Brown & Sharpe Manufacturing Company, Fisk Rubber Company, National Cash Register Company, Spencer Heater Company, Pacific Mills, the Pullman Company and similar firms roughly indicate the lines of trade to which the truck has already been adapted.

The advantages of this type of storage battery truck are already evident to the officials of railroad and steamship companies and to many manufacturers and warehouse men. The wholesale grocers and dry goods people are becoming interested, and soon we shall see a great improvement in the handling of internal freight through its use. We have ample proof, and so have other manufacturers of similar apparatus, of its practicability and efficiency.

It should not be overlooked that this small truck has many of the fundamental advantages of its larger brother in the street—namely, it is clean, odorless and practically silent; its simplicity of construction is a great aid in operation and maintenance, and its freedom from fire or explosion commend it to fire commissioners and underwriters.

Mill Conditions and Market Reviews.

SOUTHERN MILL SITUATION.

(Special Correspondence.)

Although the past year has brought changes, political, economic and financial, including a new tariff, new currency bill, income tax, and the last steps of what will doubtless be the greatest engineering feat of the age, the Panama Canal—with all these varied and various changes, we find the textile traders in better condition than anticipated. The new tariff has not as yet proved a serious check, although its full effects are yet to be seen. American manufacturers, however, have shown energetic readiness to meet new conditions ,and thus far we note that the importations of foreign cotton and woolen goods have not been such as to seriously threaten American manufacturers. The retail trade as a whole is reported hardly as active as a year ago, though in very sound condition, notwithstanding the New York failures of a few weeks ago, these failures having been due to special causes, and all look forward to a large business during 1914.

During the past year plans have been made for an extension of American trade abroad by the creation of commercial agents by the Department of Commerce; important steps in the government's participation in relations between capital and labor were the creation of a new portfolio in the cabinet for a Secretary of Labor, although the value of this new office is yet to be proved; and the creation by Congress of a Federal commission on industrial relations, which has begun a study of the entire subject.

Agriculturally, the year was one of unprecedented prosperity. While the volume of crops was below the average, their value totaled nearly $10,000,000,000. With reports on every hand of the usual semi-annual dividend disbursement from Southern cotton mills during the month of January, our confidence in the American manufacturers to meet any new conditions due to adverse tariff legislation is strengthened. We note that last year the Fall River mills paid a trifle better than 7 per cent, the highest average percentage since 1909 and the largest aggregate of dividends since 1907. The rate of dividends paid in 1912 was only 4½ per cent, and the aggregate of dividends disbursed last year was more than $900,000 in excess of the amount in 1912. These are astonishing figures when we consider what a paralyzing effect the new tariff was expected to have on industry. The "tinkering" with the tariff was begun in April, and the business of the last quarter of the year was done under the new rates.

The Bureau of the Census early in January issued its annual report of the supply and distribution of cotton, and this report has some very interesting figures about North Carolina. The state has about 3,593,999 spindles, 3,565,261 of which are described as active. It consumed 876,359 bales of cotton, 8,528 of which were grown abroad. At the end of the year there were 69,575 bales in manufacturing establishments.

The report further states in regard to the localization of the cotton industry: "The development of the cotton manufacturing industry in the United States, which is one of the remarkable achievements of the country, properly dates from the introduction of the Arkwright machinery in 1790, although as early as 1775 a spinning jenny of twenty-four threads was put in operation in Philadelphia.

"In the cotton mill industry, water power facilities more than any other factor have determined the location of the mill centers of the United States. For many years after the establishment of the industry water power was used almost exclusively to operate the machinery, although small mills were sometimes operated by animal power. As late as 1870 more than two-thirds of the power used in the industry was water power. In a report made by the Secretary of the Treasury to Congress in 1810 the number of cotton mills erected up to the close of the previous year, including 25 then building, was given as 87. The 62 then in operation were using 31,000 spnidles."

When interviewed by COTTON'S representative, President A. L. BAKER, of the Virginia Cotton Mills at Swepsonville, N. C., made the following statement in regard to present business conditions:

"At the present time business conditions are very much depressed which is always the case around the holiday season until about the middle of January, as people are more interested in balancing up their books and finding out whether or not they have made any money, than they are in purchasing goods of any kind. It is a little too early yet to make any positive assertion as to what effect the tariff and currency legislation, recently passed, will have upon the business of this country. There are a great many things which have a bearing and influence on the pulse of business. The Mexican situation and any renewed agitation of legislation against the big interests would tend to have a depressing effect.

"In regard to conditions in my immediate vicinity, I must confess that I hear a great many complaints, but some people are 'chronic growlers' and always have a 'grouch' on. As for myself, I am of rather an optimistic nature and

feel very hopeful in regard to the outlook for the year 1914, provided our wiseacres in the house and senate will only permit the people of the country to digest that legislation which has already gone upon the books."

JOHN F. SCHENCK, treasurer of the Cleveland Mill & Power Company at Lawndale, N. C., in discussing the present tariff situation for COTTON, expressed it as his opinion that "the recent revision of the tariff has been made so cautiously and conservatively, and came at a time when business conditions were so favorable and healthy, that practically no ill consequences have followed. To my mind," continued Mr. Schenck, "the country should feel gratified over this clever piece of work of the present administration. The gradual reduction of a high protective tariff toward a purely revenue basis is a step in the right direction.

"At the risk of being considered eccentric and impractical, I do not mind saying that I am conscientiously of the opinion that an ideal tariff should be designed only for raising revenue, and, furthermore, should be non-discriminatory.

"I am a manufacturer, a firm champion of the manufacturer's rights, and interested in his legitimate success; but I do not approve of the principle of imposing high or discriminatory duties for the main purpose of shielding him from competition. I concede that after many large and important industries and the business of the whole country have been built upon the artificial and unstable basis of a protective tariff, it would be ruinous and foolish to make a very sudden and radical move toward the ideal condition. Nor is it right to make reductions that clearly show bias in favor of any class or section.

"Adjustments should be made gradually and fairly in order to avoid disastrous results and a reaction to greater extremes than we are properly trying to get away from. I am not inconsistent in this expression of conservatism. There is no more inconsistency in condemning the principle of tariff for protection, while opposing a radical reduction, than there is in the advocacy of total abstinence while refusing to suddenly deprive an unfortunate dope victim of the stimulant which has become the artificial foundation of his vitality.

"Nor is it inconsistent for an advocate of tariff reduction to adhere to the doctrine of 'equal rights for all' and insist upon retaining for himself and his people about the same measure of protection as that retained in favor of others under the same government.

"The point I wish to emphasize is this: The sooner this country can safely enact and adjust itself to a *non-discriminatory tariff law for revenue only* the better for it.

"We are asked, 'Where would our manufacturing industry be if it had not been protected during the brief but rapid development of our country?' It is asserted that foreign competition would have strangled all of our industries in their infancy. But this is simply conjecture. If we had never had a protective tariff, it is not impossible that we might now be supplying with manufactured goods the greater part of America and also competing with the world in the great markets abroad.

"Without governmental favors, our industrial development might not have been so rapid, but it would have been sounder and broader and better able to cope with the world, as it must eventually do. No industry nor people can attain the best development or lay the strongest foundation for long life without training against all contestants in the world's great arena.

"If it ever appears to be necessary for a government to foster an industry against disastrous and designing foreign competition, the government should own and control that industry.

"If the main purpose of maintaining a government is the promotion of the highest degree of satisfaction and contentment among its people, then there is a much more important phase to the tariff question than the purely commercial phase usually discussed. There is a moral question involved that is worthy of profound consideration, and one which seriously concerns national character.

"Discriminatory protective tariffs, enacted for the benefit of special industries, are a sort of favoritism which will tend to emasculate those who are protected and render them incapable of competing with others who have learned to take care of themselves—a sort of favoritism that will naturally be resented by less pampered classes—a favoritism which will even be beyond actual justification, arouse jealousy and class hatred, and awaken in the public mind a distrust of its own representatives and political institutions.

"The principle of 'equal rights to all and special privileges to none' cannot be, or even seem to be, violated by a law-making body without seriously diminishing public confidence in that body. Even the recipients of the special favors naturally join in this general feeling of disrespect.

"The practice of any conduct that resembles favoritism by a legislative body is tantamount to advertising that the body has special gifts to bestow upon such applicants as are most ingenious and persistent. And it constitutes fair notice to all interested parties that he who sits still and depends upon receiving fair and equal consideration when the scramble for government favors is on will be grievously disappointed when it is over.

"With such a general understanding among the people, what are we to expect less than that which was recently called 'insidious lobbying?' A scrambling for the most and the best that is to be dished out, and the only effective method of securing even a fair share of the government's donations—a continuation of an old, old custom about which the administration recently made a most absurd and laughable fuss, pretending to be shocked and surprised over a thing which has long existed, and will ever exist so long as the prevailing custom of government discrimination shall continue.

"The acceptance of government favors for the sake of private gain is a tacit acknowledgment of weakness and incapacity. Special government assistance logically carries with it government control. Hence much of the needless and humiliating interferences with which private business is often afflicted through the instigation of persistent and demagogical agitators.

"If the government would boast of a truly great and honorable citizenship and retain its loyalty and respect, it should insist on every man, through his own merit, working out his own success. It should not unman him by making a baby of him, nor humiliate him by tyranny. It should encourage in each citizen a spirit of pride and wholesome independence—self-confidence and self-respect—

and grant to each the broadest liberty consistent with the general good.

"My ideal government is one that possesses a contented and loyal citizenship and is filled with many independent and flourishing industries which ask no special favors of the government and receive from the government no special kicks."

It might be well for the country at large if the proponents of the Bartlett-Bacon bill, now before Congress, could become imbued with the thought expressed by Mr. Schenck when he said, "the principle of 'equal rights to all and special privileges to none' cannot be, or even seem to be, violated by a law-making body without seriously diminishing public confidence in that body. Even the recipients of the special favors naturally join in this general feeling of disrespect."

The Soft Yarn Spinners' Association held a meeting at the Piedmont Hotel in Atlanta on January 28. As usual, this meeting was open only to members.

It is of interest to note that the company which was to organize and equip the buildings formerly occupied by the Josephine and Wahetta Mills at Cedartown, Ga., are still working on this proposition and are expected to soon be in a position to install 15,000 spindles.

The Union Cotton Mills, of Maiden, N. C., has purchased some additional picking machinery.

The French Broad Manufacturing Company, of Asheville, N. C., has awarded a contract for eight jacquard looms, and it is reported that their present intention is to add 52 more of these looms a little later.

The Lynchburg (Va.) Cotton Mill Company is to enlarge its plant. Money for this purpose has been appropriated, but no announcement has as yet been made as to what machinery will be purchased.

A new hosiery mill is being equipped at Wilmington, N. C., by John H. Kuck, which will be known as Kuck's Hosiery Mill. The building nearing completion is to be equipped with 50 knitters, 12 ribbers and 8 loopers, driven by electricity. This will give a daily capacity of approximately 300 dozen pairs of half hose, and it is expected later that a 40x200-foot building of standard mill construction, covered with metal and costing $6,000, will be added, as well as a 40x50-foot brick construction building, costing approximately $2,000, for dyeing equipment, engines, boilers, etc.

The Brown Mills, of Concord, N. C., is to add 6,000 spindles to its present equipment.

The Anniston (Ala.) Knitting Mills Company is planning to erect an additional mill. This will probably comprise a two-story building containing 20,000 square feet of floor space. This will double its present capacity, which is 400 dozen pairs of hosiery daily.

The O. K. Knitting Mills at New Orleans has organized, with $25,000 capital stock, and ordered 25 knitters for the manufacture of sweaters.

The Hermitage Cotton Mills at Camden, S. C., will install 200 additional looms, for which the contract has been awarded.

It is of interest to note that A. L. Hatch, who has been overseer of carding at the Tremont & Suffolk Mills at Lowell, Mass., for eleven years past, has recently become overseer of carding at the Danville Cotton Mills at Danville, Va.

Fred B. Noble has awarded the contract for the erection of a building at Cedartown, Ga., where he will establish a $25,000 plant to manufacture cones and tubes for the textile trade. The machinery purchased will allow for a daily capacity of 50,000 cones and tubes.

The Jennings Mills at Lumberton, N. C., will add 2,000 spindles to their present equipment. These will be furnished by the Whitin Machine Works.

The Century Knitting Mills has been incorporated at Old Fort, N. C., with a capital stock of $25,000. It is understood that this company is to build a plant and do a general knitting mill business.

NEW ENGLAND MILL SITUATION.

(Special Correspondence.)

The strong fundamentals in the cotton goods markets which were in evidence during the passing of the wave of business pessimism at the end of the year have asserted themselves in the past few weeks, and there has been a partial recovery in prices and a fair continuation of the demand for merchandise. Mills in this section are still running as full as they were in the last quarter of 1913, and while the margin of profit is still very close, there are no troublesome accumulations of goods. Many staples are just as scarce for spot delivery as they were in November, and spot goods command a slight premium in several directions.

An irregularity of price has crept into the markets, and many manufacturers believe it is due to the effort of each mill to secure business to meet its own condition, regardless of what other mills may be doing on similar products. This is regarded as the natural outcome of the effort to adjust sales and production to new market influences which are brought about in part by apprehension of the effects of the new tariff, and in part by the hesitation shown in placing long contracts save on the best standard merchandise.

Early in January, Lonsdale 4-4 bleached goods were reduced one-fourth of a cent a yard. This occurred after an announcement by the agents handling Fruit of the Loom 4-4 goods that there would be no change in price on those cloths during January. Cabots and Hills followed the decline in Lonsdales, and then a western jobber postal-carded the trade, offering certain brands of goods at agents' prices or a little below them. This naturally gave rise to unsettlement in the minds of wholesale buyers who were coming to New York markets to place orders for a new season. That the lower prices stimulated buying of the goods affected is a fact not disputed in the trade.

The new prices named on cotton blankets for the fall season of 1914 were from 5 to 7½ per cent higher than the prices of a year ago. The largest of the New England lines were quickly sold up. It had appeared previous to the formal opening of the new season that stocks of the goods in distributers' hands were small, and that some of the largest mills were still obligated to deliver goods during January and February on old orders. Of the strength of the merchandising position there was no question among jobbers or commission merchants.

When prices were named on flannelettes and the lighter weight napped cottons by Amory, Browne & Co., advances

ranging from 2 to 3 per cent were named. This advance was not followed by the Amoskeag Manufacturing Company. The old prices of 1913 were continued, except in the case of one sub-count line, which was reduced about 3/8 of a cent a yard. Additional sub-count lines were offered by the big company. This condition was not met by the naming of prices for two or three days later by other concerns, and the hesitation added to the unsettlement of buyers' ideas of general values. Some agents of Southern mills declined to meet the erratic and very low prices made by some of the Eastern mills, and while the Amoskeag Company secured orders freely, some of the other mills booked their business in a moderate way, holding for values that would make mills whole.

It is now manifest that the new prices on napped goods in the lighter weights will make a lean year for the mills, and to meet this situation some mills will divert their looms to other products and lessen the output of cloths that do not give an average chance for profit. When prices were named on fall ginghams, the values current in the previous season were continued. The Amoskeag Company offered a completely new cloth, called "Amoskeag Dark Effects," and thus avoided the losses that have always been taken by mills making large quantities of dark patterns in light colored lines sold in spring.

Several New England mills have brought out high-priced novelty cloths for fall, and business on them has been coming along well. The lines of Parkhill novelties include some of the choicest plaids ever attempted by American concerns. The Bates mills have brought out new designs in Ripplette and also several new cloths. The Barnaby mills are making high novelties in plaid patterns and in many new weaves from ratine and novelty yarns. Several New Bedford mills are still working on crepes, rice cloths, ratine novelties in checks and stripes, and fancy voiles. In the past two or three weeks reorders on this class of merchandise have been more numerous, but the lots that are ordered are comparatively small in volume.

Wide print cloths and convertibles have been in better demand and have gained from 1/8 to 1/4 cent a yard in price from the low points of December. Stocks of all classes of goods at Fall River are reported to be about a million pieces, which is unimportant when distributed among 100 mills. Narrow print cloths are steadier, but the demand is light. In two weeks during the month sales exceeded the output, and, with the goods due on delivery, the sales placed the mills in a fairly strong position when the month closed.

There has not been much business doing on staple prints. Percales are still due in a fairly large way on old orders, and printers have not yet named prices on these goods for fall. The current prices are based on 9 cents for 4-yard 80 squares, and printers say that, with the gray cloths selling at 7¼ cents, they do not see any possibility of a reduction when new season values are decided upon. Two printers accepted orders for Manila to the extent of 2,000 cases of prints, the patterns and colorings to be decided upon later, as the needs of the market require. Fancy printed goods are in better demand than for several seasons, and printed crepes, voiles, ratines and rice cloths have sold well. All the large printers are busy.

Bleachers and finishers say they are kept busy on rush orders, but find it difficult to accumulate late business on contract delivery. The explanation is found in the caution of converters and others, who have not cared to accumulate stocks pending the uncertainty of orders from the trade. Easier money conditions are gradually changing this phase of trade, and manufacturers look for a broader call for contract goods in the next few weeks. There is not much thought that prices will rise in any important way, as they feel that competition will be harder during the constant pressure to readjust values to the levels that are constantly being made by closer contact with the inflow of foreign goods.

The labor conditions among operatives are not satisfactory. For the past month there has been a strike on among folders in the American Printing Company, backed by a folders' union. It is an effort to standardize wages of a class of workers already well paid. Comparisons of wages paid for similar work in different sections are being made under the supervision of a state board of arbitration. The temporary settlement of a request for wages at Fall River by a positive refusal on the part of manufacturers to make advances now is not expected to last longer than the spring months at best.

Easier money markets and the scanning of returns from the mills during the past year have resulted in a better tone in the mill stock markets. The investment situation in New England has been so greatly upset by the decline in the values of railroads tributary to the territory that mill shares look inviting, although there has been much talk of what might be the effect of low tariff on the industry as a whole. It is also apparent that more attention is being given to the need of skilled management in the mills, and where there are weak spots stockholders are manifesting interest enough to warrant looking for early correction.

Reports from machinery concerns show that there are prospects of a moderate extension of the industry during this year. It will take place largely at the South if present plans mature. Two or three of the large concerns are operating full time, but not with full working forces. Automatic looms are being called for generally, and the concerns that make attachments for looms for fancy and novelty work have been kept busy. Most of the expenditures in New England are being directed toward greater efficiency in present mills rather than the extensions of plants, and it is believed that this will be the policy all through the year.

For the first time in some years competition in the yarn markets between Eastern and Southern mills has been persistent and hard. The Eastern mills have not been able to secure a full volume of trade on the fine numbers. The market is not calling for them, and the influence of foreign yarn prices is felt indirectly in lessening the values that can be secured on the best qualities in the home market. This has driven the yarn mills to the coarser numbers, and during the past three months some low offers on contracts for numbers below 50's have been tendered to users from Eastern mills.

Most of the yarn mills are trying to confine their work to the special requirements of customers, and there have been many notable instances of mills that have gone along steadily on long contracts when mills making staple qualities have been hunting for business. This is particularly

true of some of the New Bedford mills and one or two of the best known yarn mills in Western Massachusetts and Rhode Island. The lace industry is making steady progress in New England, and domestic laces and embroideries have become of large influence in the markets. This is undoubtedly due to the fostering influence of the Payne-Aldrich bill in stimulating importations of lace and embroidery machinery free of duty.

COTTON CROP CONDITION AND A REVIEW OF THE MARKETS.

(Contributed Exclusively to COTTON.)

BY H. AND B. BEER, NEW ORLEANS.

Fulfilling expectations, developments since the opening of the new year have been of a favorable character. Idle machinery in the iron and steel centers of the country has been set in operation; money in America and abroad is decidedly easier; there has been large investment buying of bonds; speculation has been revived in Wall street, and, as a result, there is a more optimistic feeling generally.

The demand for cotton in the South and in Liverpool has been very good at advancing prices thus far this month, and the outlook for the last half of January is very promising. The continuance of large exports to Europe is indicated by the urgent demand in the interior and the large volume of cotton arriving at tidewater.

Spinners of the world continue to take largely of American cotton—thus far this season 7,226,000 bales, compared with 6,876,000 for the corresponding period of last season, the excess over last season to date being 350,000 bales. Of this increase over last season's takings, the American mills are credited with 194,000 bales.

According to the Census Bureau, the consumption of cotton by the mills of the United States from September 1 to January 1 was 108,000 bales larger than the previous record of last season, which indicates a total consumption by the American mills this season of nearly 6,000,000 bales. Last season the mills of Europe consumed 9,316,000 bales of American cotton. Under the circumstances it is probable that the mills of the world will consume about 15,000,000 bales of American cotton this season, as against 14,903,000 last season, if the cotton is available.

As to the probable size of this season's crop, indications still point to a commercial crop of about 14,250,000 bales, much of which is very low in grade, and a large percentage of this is very poor cotton. It is for this reason that southern spot markets are ruling so firm and advancing again owing to the scarcity of white cotton.

To illustrate the strong statistical position of the staple, it is only necessary to point to the following comparatives, based on the probability of this season's crop being 14,250,000 bales:

American cotton.	This Season.	Last Season.
Visible supply, Sept. 1, 1912.....	1,055,000	1,352,000
Indicated crop	14,250,000	14,167,000
Total probable supply	15,305,000	15,519,000
Total probable world's takings.....	14,800,000	14,474,000
Indicated visible Sept. 1, 1914..	505,000	1,045,000

Of this season's crop there has been marketed to date 10,719,000 bales, against 10,412,000 to even date one year ago; and on the basis of a crop of 14,250,000 bales, the South has less cotton to market during the remainder of this season by 225,000 bales than was marketed after this time last year—3,531,000 bales against 3,755,000 bales. In addition to this, the world's visible supply of American cotton is now 340,000 bales smaller than at this time last season.

It is evident, therefore, that unless this crop is much larger than it points to now, high prices will have to be paid for the remnant of this season's yield, especially as a large portion of the cotton now on hand is of an undesirable character.

Under the circumstances there is every evidence that a very large crop will have to be planted and raised this year if lower prices are to be witnessed next season. In 1911 a crop of 16,000,000 bales was made on a record large acreage and good weather from planting time to the maturity of the bolls.

While it is a little too early to make a report on the prospects for the next crop, attention is to be called to the fact that farm work in preparing land for spring planting, while up to the normal east of the Mississippi River, is very backward in the western half of the belt, due to the incessant, heavy rains and recent floods, especially in Texas. One redeeming feature is that there is a good season in the ground.

THE YARN MARKET.

The yarn market for the past month has been fairly active, and while there has been considerable competition between some Eastern and Southern mills on certain numbers of yarns, and there was a tendency for prices to slide off about the middle of the month, the tone has gradually improved, and conditions at the close are fairly active and brighter. The first week of the new year found buying principally for quick delivery, and with prices generally weak and a downward tendency, largely because of the uncertain raw cotton market. There was a fair demand for single combed yarns, but two-ply combed yarns were dull. Some of the Southern spinners on 16's to 20's combed peeler were well sold up and were asking as much as Eastern spinners were asking for mule spun cones. Sales of Southern fine spun 12's and 14's were made on the basis of 26½ cents for 10's. There were numerous reports during this period that dealers were selling weaving yarns short, and many of the spinners were laying low, with the intention of doing some squeezing in case the rumors proved true.

The middle of the month found cotton yarn prices still on the down grade, and with a number of mills anxious for orders, but unable to see their way clear to accept business at the prices buyers were offering to pay. Commission men in the New York market were of the opinion that spinners had reached the limit on prices, and that most prices were abnormally low compared with the cost of cotton. There were some English yarns being offered in the higher counts, but the prices named were considerably in advance of those quoted on the same numbers for domestic yarns. Conditions in the weaving trade ranged from dull to good, while underwear manufacturers bought coarse numbers, and carded yarn hosiery manufacturers were re-

ported to be in the market for Southern frame spun 12's, 14's, 16's and 18's made of white stock, and a number of sales were made on the basis of 21 cents for 10's. Combed yarns were in moderate demand, and there was a little better feeling in this section of the market.

As the month closes there is a better feeling all around and more confidence is being shown than for some time past. Southern spinners are still bullish on cotton and also on the general business situation. It is generally conceded that white yarn is to be at a premium because of the scarcity of white cotton this season. The demand for combed yarn still continues rather light, even in single combed peeler on cones. The buyers still consider the prices too high. Eastern mule spun combed peeler on cones were sold on the basis of 27 cents for 10's. Sales of 14's, 16's, 18's and 24's were made on this basis, but some of the knitters considered that this price was too high. There have been inquiries for Southern frame spun single combed peeler on cones, but most of the buyers would not pay more than 25½ cents on the basis of 10's, while the best price dealers could quote was 26 and 26½ cents, basis of 10's. The demand for fine two-ply yarns on cones is confined to small quantities for quick delivery. Sales of 40's two-ply were made at 38 to 41 cents, 50's two-ply from 44 to 46 cents, and 60's two-ply from 49 to 53 cents. There is practically no change in the weaving situation as the month closes.

Recent quotations on the Philadelphia market are as follows:

Southern Single Skeins.

4s to 8s	19½@20	16s	21½@22
10s	20½	20s	23
12s	20½@21	26s	24
14s	21 @21½	30s	26

Southern Two-Ply Skeins.

8s	19½@20	24s	24 @24½
10s	20 @20½	26s	24½@25
12s	20½@21	30s	26
14s	21 @21½	40s	31 @31½
16s	21 @21½	50s	36½@37
20s	23	60s	45

Carpet and Upholstery Yarns in Skeins.

9-4 slack	20½	8-3-4 hard twist	18½@19
8-4 slack	20		

Southern Single Warps.

8s	20	20s	23
10s	20½	24s	24
12s	21	26s	24½
14s	21½	30s	26
16s	22 @22½	40s	31½

Southern Two-Ply Warps.

8s	19½@20	24s	24½
10s	20½	26s	25
12s	21	30s	26 @26½
14s	21½	40s	31½@32
16s	22 @22½	50s	37
20s	23 @23½		

Northern Two-Ply Carded Peeler Skeins.

20s	24½@25	36s	32
22s	25 @25½	40s	33
24s	25½@26	50s	38
30s	27½		

Two-Ply Combed Peeler Skeins.

20s	30	50s	44 @45
24s	31	60s	48 @51
30s	33 @33½	70s	57 @60
40s	38 @40	80s	67 @69

Single Combed Peeler Skeins.

20s	30½@31	40s	40
24s	32	50s	46 @47
30s	34 @35	60s	53 @54

Southern Frame Spun Yarn on Cones.

8s	20 @20½	20s	23½@24
10s	21 @21½	22s	24 @24½
12s	21½@22	24s	24½@25
14s	22 @22½	26s	25 @25½
16s	22½@23	30s	26½@27½
18s	23 @23½		

Northern Mule Spun Carded Yarn on Cones.

4s to 8s	21 @21½	20s	24½
10s	22	24s	25½@26
12s	22½	26s	26½@27
14s	23	30s	28 @28½
16s	23½	40s	33 @34
18s	24		

Northern Mule Spun Combed Peeler Yarn on Cones.

10s	27 @27½	22s	30½@31
12s	27½@28	24s	32 @32½
14s	28 @28½	26s	32½@33
16s	28½@29	30s	34 @34½
18s	29 @29½	36s	37 @37½
20s	30 @30½	40s	39 @40

THE KNIT GOODS MARKET.

Conditions in the knit goods market for the past month have been, on the whole, very good. Early in the month the underwear buyers from the jobbing trade began arriving in the market early to complete their original orders on heavy goods, and also in some instances to place fair sized duplicate orders for spring underwear. New business of this kind in balbriggan shirts and drawers were said to make a considerable total. Large mills were, as a rule, entirely sold up for the early spring months. There were some improvements in the carded yarn hosiery line, although it is apparent that the season has been backward in cotton lines. Several reasons are given, the chief one being the slow jobbing business of November and December as a result of the mild winter. Mills making complete lines of fleeces had an excellent advance business, but some market factors indicated that early expectations were not being entirely realized. The strongest feature of the market at this period in cottons was in boys' and misses' heavy goods. The German market was not as strong as it was a month previous, and it was reported that some German manufacturers were willing to take orders of size at prices below their earlier quotation.

The middle of the month found the Knit Goods Jobbers' Association at the Waldorf-Astoria with an attendance of about forty members. Several subjects were discussed before the convention and new officers elected for the ensuing year. While these underwear buyers were in the market in good number, the report as to the status of the fall trade was still conflicting. The conclusion arrived at, however, was that a large amount of fall business had been placed in cotton underwear of all kinds and also some wool goods. The standard lines of ribbed goods were all reported well sold for this period of the year, and Southern mills in particular were showing enthusiasm over the business booked for fall in ribbed underwear. Less was heard at this period of price revisions on account of change in the cotton market, and selling agents and mill heads let it become widely known that the actual price of good cotton was by no means represented in the market price indicated during this period.

The close of the month finds little change in the situation as far as the heavy cotton lines are concerned. There is no question but that the ribbed lines are well placed, and while efforts have been made this season to introduce into this country foreign-made wool underwear, the reports for the domestic underwear trade in woolens seemed to be more uniformly favorable than even the heavy cotton lines. Everything considered, the knit goods situation is at the present well in hand and prospects for the future fairly bright.

According to information furnished by the Japan Cotton Spinners' Association, the number of spindles of the 44 spinning companies (exclusive of factories under construction) in the consular district of Kobe on June 30, 1913, was 2,239,532 ring and 49,360 mule, in addition to 309,672 doubling spindles and 23,783 looms. Compared with the end of the preceding half year (December 31, 1912), the number of ring spindles shows an increase of 114,552, doubling spindles 348, and looms 1,885, but there is a decrease of 2,388 in the number of mule spindles.

COTTON MANUFACTURING.

CLOTH ROOM METHODS AND MACHINES.

(Contributed Exclusively to COTTON.)

BY C. T. FALLIN.

We were just getting ready to ship the goods when we left off in the last paper, so I will now show a form of shipping ticket, Fig. 5, that is comprehensive, complete and a great labor saver. We first open our book of current orders (see Fig. 6) and find that order No. 1021 is for 20,000 yards of style No. 12345, Pat. 2, on account of Rankin, Smith & Co., New York, who instructs that these goods be shipped one bale weekly to John Doe Bleachery Company, Knotsville, Nev., to be finished. Turning now to our bale record (Fig. 4), and at style 12345, Pat. 2,

SHIPPING TICKET No. 145

Blank Cotton Manufacturing Co.

Style No. 12345 Pattern 2 Grade B

SHIPPED TO John Doe Bleaching Co. Knotsville

Via Central Air Line R.R. Nev.

Account Order No. 1021 Invoice No. 506

Entered on Ledger Folio No. 672

Date Shipped 8-5-13

BALE No.	GRADE	PIECES	YARDS	POUNDS	BALE No.	GRADE	PIECES	YARDS	POUNDS
10001	B	22	1223	304					
TOTAL					TOTAL				

Shipping Clerk _____ Overseer

FIG. 5. THE SHIPPING TICKET.

we find three bales ready for shipment. As only one is desired, we take the first, No. 10001, which in this case is a bale of single cuts, first quality, and, according to the conditions as specified on the order (see Fig. 6) is applicable. We now take from the stack of consecutively-numbered shipping tickets the first, which in this case is No. 145 (see Fig. 5). Having filled in the style, pattern number and grade, we follow the instructions of our customer and write in the address of the finisher, also the route by which we wish to ship; next the order number and date when this and all similar tickets are made for the day's shipment.

Having prepared the shipping tickets, these are taken to the warehouse, where the bales are already marked with the bale number, style and pattern number, also the yards, and as the bales of each style should be grouped together, there should be no difficulty in finding, stenciling and checking these bales. The shipping ticket should be made to allow for 20 bales, to accommodate it to orders of varying sizes. These tickets are then taken to the bookkeeper, shipping clerk, or whoever is to make out the invoices, and who marks thereon the invoice number; then to the bookkeeper, who enters them into his books and marks on the ticket the ledger folio showing where the account is to which these goods are charged.

It will now be plain that on these shipping tickets is a complete and comprehensive record of the shipment which no system of shipping book could give, and with considerably less work. When the goods are shipped, invoiced and entered in the ledger, these tickets are filed in filing cases, prepared for the purpose, in almost the same manner as the style records are kept, thus giving a complete record at both ends of the mill.

A filing case with two drawers like the style cabinet should be prepared so the shipping tickets will just fit therein, and the size of Fig. 6, which is the order memorandum form, should be made exactly the same as Fig 5. This order book should be of loose leaf form to facilitate removing the leaves for filing. The two drawers in the filing case should be for orders current and for orders filled. For every current order we have in the order book (Fig. 6) a copy of the original order showing the exact status of the order and every other necessary detail. As soon as this particular order is filled the memorandum slip is taken from the order book and placed with all the shipping tickets which have been used in this connection. These tickets should have been kept together with rubber bands until this time in the orders current drawer of the shipping cabinet, but should now be taken out, the bands taken off, and, with the copy of the order memorandum from the order book, placed in their proper location in the drawer of the shipping cabinet, marked "orders filled," first having bound them with a string, and with the order memorandum showing on the top of the stack. The consecutive order of placing these records in the shipping cabinet should only be broken by the absence of the records in one drawer indicating their preference in the other.

A study of this shipping system will show its reliability as a record, its time-saving possibilities, and, above all, its simplicity, which causes it to appeal especially to small mills that are unable to employ highly educated men to look after their shipping, or those which must have it done by men giving to it only a part of their time, deficient, perhaps, in education, but proficient in some other line.

In my opinion, it is much better to have Figs. 3 and 4 also used in loose leaf book form, using the tab system of indexing where necessary. A brief explanation of this loose leaf system may appeal to those readers who are not familiar with it. Procure quite a number of pages ruled according to the form, the ones illustrated here just as they are, or with such alterations as may be desired. Have for individual mills a few pages left blank for index pages. When a new style is begun, put enough pages of ruled form into the binder, and on top place a blank page. At the edge of this blank page place a "tab" composed of leather or very stout paper. These tabs may be purchased of the book manufacturers, who use them as indexes to business

ledgers, but if bought they should be in blank form. These tabs have long feelers or holders that fasten back on the blank page with glue. I have used simple leather scraps from the roller shop, cut about six inches long, doubled and pasted or glued so about two inches of leather will go back on both sides of this blank page, leaving about one inch doubled extending from the front edge of the page. When these pages are in place and the tab properly placed, push the lids of the binder together and lock. On the extended tab write with a pen the style and pattern of the new goods to be recorded.

The tabs will come in consecutive order through the book, and when a style has run out as the order is filled, take these forms whereon entries have been made and

ORDER MEMORANDUM.

Blank Cotton Manufactoring Co

Mills Order No. 1021 Buyers No. 0000
Mills Style No. 12345 Pattern No. 2
Amount of Order 20000 Yds.
Charge to Account of Rankin Smith & Co
Business Selling Agts
Address St. New York, N.Y.

Goods to be Shipped to
John Doe Bleaching Co
Knotsville
Nev.

Conditions agreed to
Construction of goods 39in 68x72 4.25 Yd plain. 68x78 Overall
Colors Grey
How Finished Double Cuts. 1st + 2nd Baled Seperately
Deliveries 1 Bale Weekly
To Begin Aug 1st 1913
Price
Discount
Amt of seconds allowed 15%
Remarks

Applications on above order.

INVOICE NO.	SHIPPING TICKET NO.	GRADE	YDS. NET CLASS	LBS. NET CLASS	YDS. NET CLASS	LBS. NET CLASS	INVOICE NO	SHIPPING TICKET NO.	GRADE	YDS. NET CLASS	LBS. NET CLASS	YDS. NET CLASS	LBS. NET CLASS
000	1145	AB	1223	304									

FIG. 6. RULING FOR THE BOOK OF CURRENT ORDERS.

place them in transfer or orders filled binder, still preserving the consecutive order of style numbers.

Where more than one pattern of the same style appears, they are transferred to a transfer binder under the proper style number, but back of the original style in the consecutive order of pattern numbers

The blank page upon which the tab is placed also has its use, as upon its blank surface is written any special instructions as to baling, finishing, classing or shipping. This data is ever and always present for ready reference in the binder and eliminates any excuse for overlooking orders.

In many cloth room systems that I have used the overseer could hardly be blamed for overlooking some particular order, as the system was so scattered and obscure that any mortal man could easily be excused for overlooking some minor detail; but here there is no reasonable excuse, for every time the overseer or bookkeeper fingers the tab before entering a bale on this bale record, he is brought face to face with any special instructions about this particular style of goods, and any discrepancy may be easily discerned, while if he does not remember any desired detail, he has the information literally at his finger tips.

On the bale record, Fig. 4, at the left side, was shown an insert, "D. A." This is shown as an insert because its meaning can be more easily explained in this form. It is, as a moment's study will show, only used at the end of the production period—in most mills once each month or four weeks. It may be prepared in a variety of forms. However, the one I would suggest is the form of an insert, just wide enough and long enough to contain this summary. This summary is to be locked into its proper place each time the books are balanced. The purpose of this insert is to show the amount of baled goods on hand whenever the books are balanced, and, as I will show a little later, a form that will indicate how much unbaled goods there are on hand, it will then be easy to check the order and know not only how much goods that are applicable on any certain order and how much has been applied, but also how much is yet to be made. Going a bit further, a check of the warps in weave room will readily show how much yet remains to be warped to complete any given order. This is really a good point, as sometimes someone will somewhere mix the warps, misunderstand some warping order, or perhaps an error in figuring on the contraction and waste in weaving will be made. It might seem a good weave, and an estimation that it would run 5 per cent seconds be made, only to find too late that it really panned out 20 per cent, and the lot is 15 per cent short on an order of, say, 250,000 yards. Supposing the goods were sold at a good profit before a sudden market decline; when the order is out, or about out, it is found to be 37,500 yards short, and if it is necessary to go back to the warping room to begin more warps it will probably mean a loss, for if the buyer allows the shipping of this 37,500 yards weeks or maybe months later than the date specified in the contract, under the circumstances it means a loss to him.

This lack of efficiency in the record system is likely to cause the loss of a very desirable customer, besides which the manager is face to face with a multitude of troubles along another line, because, not anticipating this shortage, other orders may have been accepted with a delivery figured on the arrangement of looms and other parts of the mill that will be all thrown out of gear because of this extra 37,500 yards of the old order still to be made. This is well worthy of thought and attention, and defines from a dollar-and-cents standpoint the value of a good cloth room system.

The estimated number of active cotton spindles in the world for the year ending August 31, 1913, was 143,398,000, an increase of 37,717,000, or 35.7 per cent, since 1900. Of the total, 25,363,000, or 38.8 per cent, are in the United Kingdom; 31,520,000, or 22 per cent, in the United States; 11,186,000 in Germany, 9,213,000 in Russia, 7,400,000 in France and 6,084,000 in India.

DESIGNS FOR FANCY COTTON FABRICS.

(Contributed Exclusively to COTTON.)

BY THOMAS WOODHOUSE AND JAMES IRELAND.

PART SEVEN.

The two striped patterns illustrated at D and E, Fig. 30, are made with a combination of the same three weaves. The ground or dark stripes are developed with dark blue threads in 5-thread sateen order, while the other stripes in both patterns are due to the 3/1 twill to left, and the 1/3 twill to right. The latter two weaves appear alternately in equal proportions and they are arranged to cut with each other. The warp for pattern D is

10 threads dark blue for dark sateen stripes;

8 threads white for fancy stripes. The 8 threads of white work as 4 double threads and the point paper design for this stripe is shown at F, Fig. 31, the draft at G, and the weaving plan at H. As mentioned before, the double threads may, if desired, be drawn through one mail. The

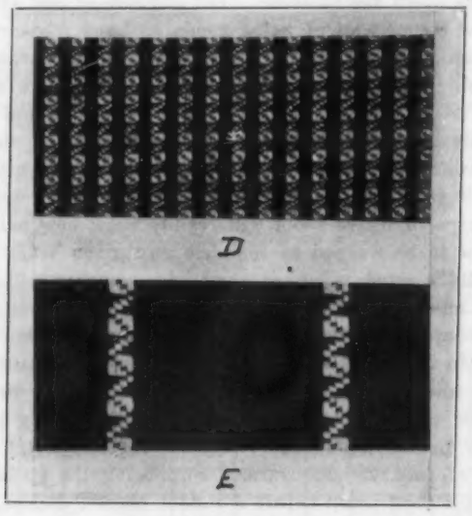


FIG. 30.

combination of a 5 pick weave and an 8 pick weave necessitates a weaving plan consisting of 40 picks. The real weaving plan would, of course, consist of 5 threads and 40 picks of the 5-thread sateen alongside 4 threads and 40 picks of the combined 4 harness twills illustrated at H.

At this stage we may with advantage explain what is meant by one weave cutting with another. In the weaving plan H, Fig. 31, it will be seen that the marks and the blanks on the 5th pick are respectively opposed to the blanks and the marks on the 4th pick, and this arrangement effectively prevents the introduction of unsightly long floats of warp in the cloth. Similar conditions obtain between the 8th pick and the 1st pick, for when these two picks unite at the junction of the 1st and 2nd repeats it is evident that while on the 8th pick there are 3 threads down and 1 up, there are 3 threads up and 1 down on the 1st pick of the 2nd repeat, or the 9th pick in the cloth. When two adjoining picks or two adjoining threads oppose each other in this way, they are technically considered as cutting picks or cutting threads, and the method of arranging pairs of picks, or pairs of threads, or pairs of both to cut with each other in this way constitutes an important phase in all branches of textile design. If the weaving plan H were doubled in two between the 4th and 5th picks it is clear that all the blanks in the lower half would come opposite the crosses in the upper half, and vice versa.

If we enlarge F, Fig. 31, by duplicating every thread and every pick we shall obtain design J, Fig. 32, and it is now easy to see that both design J, Fig. 32, and design F, Fig. 31, are made from the same units, *e. g.*, the 3/1 twill to the left, and the 1/3 twill to the right. The threads in the narrow stripes in pattern E, Fig. 30, float over or under pairs of picks, or multiples of two picks, and they also run in groups of four. This alteration of the method of interweaving the same units, and the great difference in the widths of the stripes, accounts for the remarkable change in the appearance of pattern E from pattern D; this difference exists in spite of the fact that the same fundamental units appear in both patterns as explained. The warping particulars for pattern E, Fig. 30 are:

Dark Blue	30	60	30	= 120
Red	16			= 16
White		16		= 16
Threads per repeat				152

The complete design of the fancy stripe part appears as stated at J, Fig. 32, while in the same figure K and L

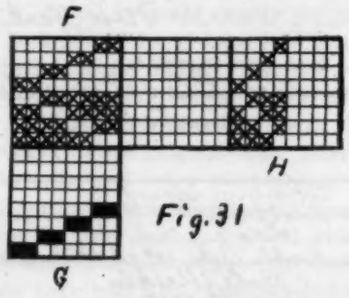


Fig. 31

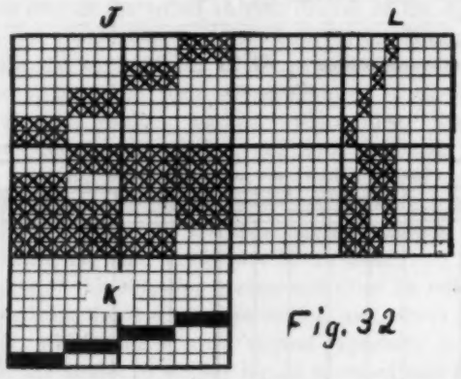


Fig. 32

represent the draft and the weaving plan. The complete weaving plan requires 9 harnesses and 80 picks.

The take-up of the dark blue threads in pattern D is less than that in the fancy white stripe; this difference results in the blue stripe occupying a higher level on the surface of the cloth than that occupied by the white stripe—a prominence which is a pleasing feature of the cloth. The reason for this prominence on the part of certain threads over others is that the prominent threads float over more successive picks than do the subdued ones, and also that they occupy the up position for a large percentage of the picks in a round. Take, for example, the threads in pattern D, Fig 30. Each dark thread in this cloth floats over four successive picks, and is on the surface of the cloth for four picks out of five, or for 80 per cent of the picks. Each white thread in the same cloth floats over a maxi-

mum of three and under a maximum of three, and also over and under a minimum of one (see H, Fig. 31). The two parts in H counterbalance each other in a measure, for it is clear that, since each thread rises for four picks in all and falls for four picks in each repeat, the percentage in both positions is 50, and hence the threads show a tendency to remain near the center of the upper and lower surfaces of the fabric.

(To Be Continued)

THE ROVING PROCESS.

(Contributed Exclusively to COTTON.)

BY H. C. W.

PART THREE.

Fig. 7 shows a type of bevel gear differential known as Tweedale's patent differential motion. In this the jack shaft A carries a short cross shaft S. The short shaft carries the bevel gears F, having 30 teeth and E having 16 teeth. B having 40 teeth is the spindle-driver and is fast to the jack shaft and turns with it. C having 50 teeth is the bobbin-driver and receives its motion from the cross shaft gears E and F, and from the gears G and H. H is driven from the cones. C is fastened to the bell carrying the bevel D. The bell is loose on the shaft and may be turned independently of it. The gears G and H are fastened to the same sleeve which is loose on the shaft also. T is the twist gear.

To explain the action of this differential we will divide the total motion of C into two parts; First, that received from the jack shaft; and, second, that received from the cones through the gears H and G.

We will first hold the bottom cone stationary, which

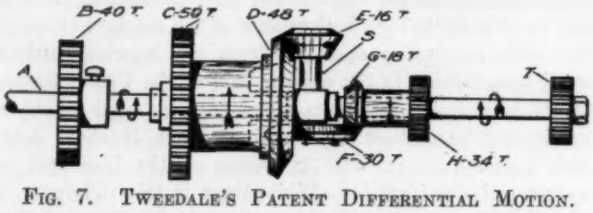


FIG. 7. TWEEDALE'S PATENT DIFFERENTIAL MOTION.

will stop H and G from turning. Then suppose we turn the jack shaft 5 revolutions in the direction shown by the arrow. This means B will also turn 5 revolutions. The cross shaft S will also turn 5 revolutions, carrying the gears E and F around with it. As E is locked with D, it would at first seem that D and C must also make 5 revolutions in the same direction. This is not so, however. As the cross shaft turns around carrying F with it, F being in mesh with G, and G being stationary, F must turn on its own axis and in a direction the opposite to that shown by the arrow. A study of the diagram will show this to be so. Now, as the cross shaft makes 5 revolutions the gear F will travel around G 5 times and over $5 \times 18 = 90$ teeth, and will make 90/30 revolution backward, or 3 revolutions. This, of course, gives the 16-tooth gear E 3 revolutions backwards and gives D $3 \times 16 \div 48 = 1$ revolution backwards, so that the resultant motion of C is only 4 revolutions for every five of the jack shaft. The arrows show the direction in which the parts actually run under working conditions.

Now, suppose we hold the jack shaft stationary and give H and 5 turns in the direction shown by the arrow. Then the resultant motion of C will be

$$\frac{5 \times 18 \times 16}{30 \times 48} = 1 \text{ revolution in the direction shown by the arrow.}$$

Thus it is seen that the bell gear C or bobbin-driver makes only 4 revolutions for every five of the jack shaft and only one revolution for every five of the gears G and H.

Suppose we consider the direction of motion of the jack shaft to be plus (+) and the opposite minus (—). Then suppose we turn the jack shaft + 300 revolutions and the gears G and H + 50 revolutions. Then the resultant motion of C can be expressed as follows:

+ 300 revolutions of jack shaft = + 240 revolutions of C.

+ 50 revolutions of G and H = + 10 revolutions of C.

Total = + 250 revolutions of C.

The gears connecting B to the spindles and C to the bobbins are the same so that the actual revolutions of the bobbins are the same as the spindle when G and H are stationary. Because 5×40 (B) $= 4 \times 50$ (C). This is the case when slackening the ends preparatory to doffing.

In this style of differential all parts on the jack shaft revolve in the same direction as the jack shaft. It is claimed this reduces friction and the load on the cone belt, giving more even winding and stronger and more even roving.

The sun and planet and Tweedale's differentials are the most common forms of the bevel gear class of compounds.

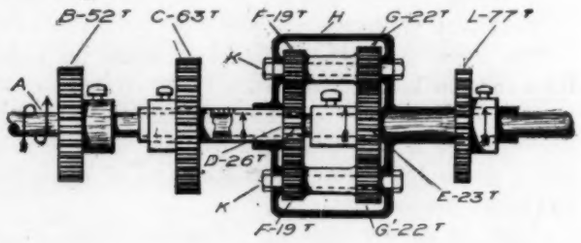


FIG. 8. BROOK'S AND SHAW'S DIFFERENTIAL.

Fig. 8 is a diagram of Brook's & Shaw's differential. This is a type employing spur gears throughout. Its method of operation is very similar to that of the other two compounds. B, having 52 teeth, is the spindle-driver and is fast to the jack shaft. C, having 63 teeth, is the bobbin-driver. It is carried by, and fast to, the sleeve of the gear D of 26 teeth, which is loose on the jack shaft.

Surrounding the compound proper is the casing H. This casing carries two studs K, carrying the gears F and F' and G and G'. These gears are paired as shown. The gear E of 23 teeth is fast to the jack shaft A and transmits motion to D through the gears G and F. The arrows show the directions in which the different parts revolve. The casing H is loose on the jack shaft, and on a sleeve extending along the jack shaft is carried a gear L of 77 teeth. This gear receives its motion from the bottom gear through a series of gears.

To explain the action of this compound and its effect on the bobbin-driver C, we will consider all gears turning in the direction of the jack shaft as having a plus (+) direction. Gears turning in an opposite direction will therefore have a minus (—) direction.

Suppose the casing H is held stationary and we turn the jack shaft 200 revolutions. Then the gear E will turn

+ 200 revolutions, and will transmit to D or C the following number of revolutions:

$$\frac{200 \times 23 \times 19}{22 \times 26} = 152.79$$ and the direction will be plus. Because if E turns plus, G will turn minus, as will F, and D will turn plus.

Consider now the revolutions of C derived from the bottom cone through the gear L and the casing H. Suppose the casing H turns + 100 revolutions. Then it seems that D would turn + 100 revolutions also, being carried around by the gear F, which is locked with it. But at the same time the gear G is in mesh with the gear E, which is stationary. Because of this fact the gear G being carried around E in a plus direction must also turn on its own axis in a plus direction, and if it makes 100 revolutions around E it would turn

$$\frac{+ 100 \times 23}{22}$$, or + 104 revolutions on its own axis.

This would also turn F + 104 revolutions on its own axis and would give D

$$\frac{- 104 \times 19}{26} = - 76$$ revolutions. Therefore, the total resultant revolutions of C obtained from L would be,

+ 100 — 76 = + 24. And the total revolutions of C for + 200 revolutions of the jack shaft and + 100 of the casing H could be stated as follows:

+ 200 A = + 152.79 C
+ 100 H = + 24. C
Total = + 179.79 C.

This means that the spindle-driver B makes 200 revolutions while the bobbin-driver makes 179.79 revolutions. The gearing to the spindles and bobbins compensates for this difference. It is such that when B makes 200 revolutions and C makes 152.79 revolutions the speed of the spindle and bobbin are the same.

There is another type of differential known as the Daley compound. It is one of the spur gear class and it is similar to the others in its action. As it would be a repetition more or less of what has already been said, a description of this particular compound will be omitted.

This explains the purpose of the compound and its action. It combines the two motions and transmits them to the bobbins. It can be likened to a fire hose nozzle fed with two lines of hose.

Its direct action on the bobbin as well as that of the cones will be explained later on. There are, however, two points to constantly keep in mind:

First. The revolutions of the bobbin equal to the spindle are derived from the jack shaft.

Second. The winding revolutions are obtained from the cones. These winding revolutions are in addition to those obtained from the jack shaft. As the bobbins fill these winding revolutions are reduced. The method of obtaining these reductions will next be explained.

(*To be Continued*).

A large amount of machinery was ordered by the cotton mills of Japan from America and England in 1912 and 1913, but much of it was delayed by strikes in England. The further postponements that are expected are not unwelcome in view of the industrial depression in Japan.

COTTON STAPLE AND TRADE NAMES.

(*Contributed Exclusively to* COTTON.)

BY JAMES G. COMAN.

Next in importance to grade as affecting the value of cotton is the length of the fiber or its staple. To the manufacturer the length of the fiber is of great importance, as it determines to a large degree the number and quality of the yarn he can produce. Also it determines the diameter of the drawing rolls on the different machines, the length of traverse used on roving and spinning frames, the settings and speeds used, all of which are, or should be, different for ¾-inch fibers than for 1-inch fibers. To the farmer it is important because long staple varieties usually do not yield as high percentages of lint as do short staples, and, unless the land is suitable for its growth, he will not clear as much on the cotton, regardless of the higher price per pound.

The length is usually expressed in inches, although millimeters are used in the European trade. All cotton should be classed in regard to length of fiber, but this is seldom done by the average country merchant or small cotton buyer, and cotton averaging ¾ inch or 1 1-16 inches in length usually brings the farmer about the same price per pound. In the upland regions this has discouraged the farmer in seed selection, attempts to keep his variety pure, careful ginning, etc., and until a distinction is made in his favor between fibers averaging ¾, ⅞, 1 and 1 1-16 inches in length, attempts to improve cotton along these lines will be slow. Fibers of the lengths given are classified under the general term "short staple," and those above 1 1-16 inches in length "long staple" or "staple." In the Mississippi delta markets the cotton is very carefully classed in regard to length, the buyers requiring longer staple for the staple name than those elsewhere. This is due principally to the requirements of the markets to which they sell, most of the cotton from the interior markets being sold to mills in the eastern part of the United States. These mills have their own standard for length of fiber, known as the eastern classification, which is about 1-16-inch higher than in what is known as the Liverpool or commercial classification. While there is this difference in regard to length of staple, there is not a similar variation in price and cotton classed 1 1-16 inches in the eastern and 1⅛ inches in the Liverpool markets will have the same value allowing for freight rates, etc.

There is always considerable variation in the length of fibers composing a sample of cotton—in fact, even on a single seed the fibers will usually vary 1-16 of an inch or more, those at the large end being that much longer than those at the small end. Consequently there is always room for more or less honest differences of opinion in regard to the average length of the fibers composing a sample, added to by the difference in the ideas of different markets. These irregularities have rendered the practice of buying and selling on type necessary, absolutely so in regard to long staple, and make an accurate and uniform means of measurement very much desired. So far no such method has been developed that is practical for commercial use. Ordinarily the length of staple is determined as follows: A piece of cotton an ounce or two in weight is pulled from the sample, grasped firmly with both hands and pulled apart. This is called the break, and by carefully observ-

ing the resistance offered and the sound made by the fibers in pulling past each other, a good idea of the length and character of the cotton can be determined. The tuft in one hand, usually the right, is then discarded, and the thumb and forefinger are used to pull off the loose and uneven fibers attached to the free end of the tuft held in the left hand. A sufficient amount of the fiber is then taken from the tuft between the thumb and forefinger of the right hand, the proper amount being accumulated by making several grasps. The tuft is then discarded and the thumb and forefinger of the left hand used in straightening the fibers held in the right hand. Finally, by changing the fibers from one hand to the other two or three times, removing the loose fibers after each change, the longest and shortest fibers are supposed to be discarded, and those remaining, now drawn straight and parallel, to represent the average length of the sample. Unless care is taken in making the pull, the straightened fibers will represent the longest or the shortest fibers in the sample, and not the average of both. A cotton expert judges the length of the pull with his eye, but a beginner should always use a rule.

The different natural divisions of the cotton belt are characterized by the production, more or less regularly, of cotton of a certain length fiber, and the trade commonly expects the general run of cotton grown in one section to have a certain length. This has given rise to certain trade names which indicate the region, length of staple and general characteristics of the cotton.

Uplands—This name is commonly applied to cotton grown in Virginia, North and South Carolina, Georgia and portions of Alabama and Mississippi. Technically, it embraces all cotton, excepting sea island, grown in the South, but, as commercially known, has the following characteristics: ¾ to 1 1-16 inches in length; moderately strong, the breaking strength of the average individual fiber being about 110 grains; soft and fine; fairly uniform in length if moderate care is exercised in keeping the variety pure; and generally moist and easy to work, but lacking body. It is especially suited for filling yarns up to 50's, and produces fair warp yarns up to 40's, the cotton from some sections being better suited for these numbers than that from others, due to soil and other conditions. Due to the large quantity and general uniformity, upland cotton is taken as a basis in determining the price of nearly all other cotton grown. It is generally known under the name of the district in which it is grown, as Georgia, Savannah, Norfolk, etc. That grown in Alabama and Mississippi is termed Mobile, and, while generally a little longer, it is weaker and dirtier and not suited for as high numbers of yarn. Grade gives very little indication as to strength of fiber, and as strong yarns can be produced from standard low middling as from standard good middling cotton.

Texas—This is another variety of uplands, but differs from the commercial type as follows: ¾ to 1 inch in length; stronger than uplands, the breaking strength averaging about 120 grains; harsher in feeling; better body, but not quite so fine or lustrous as uplands. The hot, dry climate is responsible for the shorter staple, lack of luster and harshness. The color of the lint is usually a deeper cream than in uplands. Texas is better suited for warp than for filling yarns, although it may be used for either up to about 40's. Mixed with uplands of the same staple, much stronger warp yarns can be produced than from uplands alone, and at practically no increase in cost. Due to the harshness of the fiber, it is frequently used to mix with wool in producing merino and other mixed goods.

Orleans or Gulf—This is the long staple class of upland cotton, and is known also under such names as "Benders," "Peelers," "Allen Seed," "Memphis," etc. The characteristics are: 1⅛ to 1½ inches in length; strong, the breaking strength averaging about 140 grains; soft, pliable and fine; moist, elastic and smooth; good body; white to light cream in color; even running and easy and economical to work; suited for warp yarns up to 90's and filling up to 120's. "Benders" refers to cotton 1⅛ to 1 3-16 inches in length, of extra strength and body, and very even running in length. This quality of cotton is not found outside the delta, where it is grown in the rich alluvial soil of the river bends of Arkansas and Mississippi. It can always be distinguished from other cotton of the same length by its strength, body and luster. "Peeler" and "Allen Seed" refer to cottons 1 3-16 to 1½ inches in length, the names being derived from former long staple varieties of the above names which were very popular, but the cotton referred to now under these names may really be of any other long staple variety. Such cotton is softer and finer than "Benders," but not so strong. It is a most desirable cotton for filling and hosiery yarns up to 120's and warp yarns to 90's. Due to the rather limited quantity of this length staple, the demand for it is more constant than for uplands and there are smaller variations in price. During the last two or three years the demand for gulf cotton by the English mills has very largely increased, and is due to the fact that the character of the Egyptian cotton which they have been using has been steadily deteriorating and has now reached a point where yarns produced from it are not equal to those made from the lower priced gulf cotton. The premiums offered for this cotton, due to the increased demand and the shortage caused by the destruction of a large part of the delta crop by the boll weevil for several years past, have been and are high, and probably would be much higher if the hobble skirt and silk hosiery had not come into fashion. However, the premiums have been high enough to arouse the interest of farmers all through the South toward improving the different varieties of cotton and the growing of long staple wherever possible. The work of the various experiment stations along these lines indicates that within a few years varieties of cotton having a staple of 1¼ to 1⅜ inches, and which are early maturing, heavy fruiters, and yield from 34 to 38 per cent lint, will be developed for upland regions. The successful introduction of such varieties will do much toward overcoming the shortage of the delta crops.

"Rivers" and "Creeks"—These terms refer to the cotton grown in the river and creek bottoms of every southern state. Its characteristics are 1 1-16 to 1 3-16 inches in length; fairly strong, the breaking strength being about 125 grains; fairly lustrous and similar to uplands in other characteristics. It is suitable for filling yarns up to about 70's and warp yarns to about 50's. It is not the equal of cotton of like length grown in the delta, but is, nevertheless, very desirable for the production of even, smooth yarns.

(*To Be Continued.*)

The South has a great line of deep-sea coast and many splendid harbors and shipping ports.

KNITTING.

KNITTING 26's CARDED YARN ON A 12 CUT MACHINE

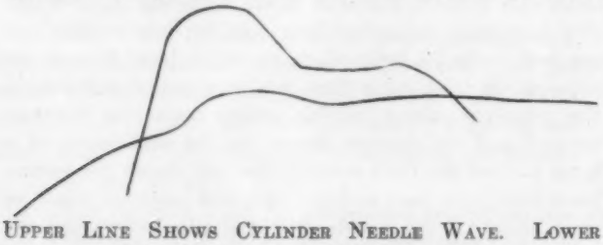
(*Contributed Exclusively to* COTTON.)

BY HENRY K. DICK.

The question submitted by a knitter reader of COTTON, asking for information about running 26's carded yarn on a 12 cut machine, has certain points of interest.

In ordinary practice a 12 cut machine would accomodate a 14½ yarn. This is about an average size for this gauge, the limits being from 12's to 15's. To change this machine over to knit 26s yarn, a number of interesting points develop. From knitting 14's to knitting 26's is a big jump and appears an unreasonable demand for any knitter to accomplish.

In the majority of underwear machines the dial needle forms its loop several needles behind the completion of cylinder needle loop. This is sometimes spoken of as a cylinder needle lead. A simple illustration will show the comparison of the two needle waves. The action of the cylinder cams is much more acute than the dial cams. The fact that the dial needle forms its loop behind the cylinder needle puts a certain limit on the fineness of the loop. The cylinder needle must draw a length of yarn to provide for both dial and cylinder needle. The dial needle may be said



UPPER LINE SHOWS CYLINDER NEEDLE WAVE. LOWER LINE SHOWS DIAL NEEDLE WAVE.

to rob the cylinder needle for yarn to form its loop. As the dial needle only draws into the dial far enough for the needle to cast off the loop, all stitch adjustments must be made through the adjustment of the cylinder cams. There is an adjustment of the dial which would affect the length of the loop.

In starting out to try 26's yarn, we would have the dial as low as possible, just leaving space enough for the fabric to pass down through between cylinder and dial. The cylinder stitch cam would be adjusted to draw a tight loop, but in this adjustment we must be guided by the amount of yarn which the dial needle will also require to form its loop. If there is not enough yarn drawn by the cylinder needle for both dial and cylinder needle loops, the dial needle will break the stitch, causing cut and defective fabric.

Some knitters change the outline of the dial cams so that the dial needle will form its loop immediately after the cylinder needle. In this method cylinder and dial needles form their loops consecutively. Such an arrangement is believed to produce a more elastic fabric. In order to produce an elastic fabric, the dial needles must draw the same length of loop as the cylinder needles. This is a knitter's greatest difficulty in knitting a fine yarn beyond the range of the machine. An examination into the cause of this will be found in the needle. The needle hook limits the size of the loop, and the loop must be large enough to pass over the head of the needle without unduly straining the loop.

The gauge of the needle in the machine under discussion is 36 gauge cylinder and 36 gauge dial needle. In a measurement of the needle it was found to be .068 of an inch in diameter at the head of the needle and .028 of an inch thick. A 42 gauge dial needle was taken for comparison and it was found to be .059 of an inch in diameter at the head and .023 of an inch in thickness. This comparison is made so that it can readily be seen what the effect would be of using a 42 gauge dial needle instead of 36 gauge needle. This is frequently done, as by using a 42 gauge dial needle, or a needle with a finer gauge hook than the cylinder, an increase is made in the range of yarns used for the machine. In the comparison of the needle given there is a difference of .009 of an inch in diameter and .005 of an inch in thickness, which must necessarily allow a smaller loop to be knitted.

A comparison of the diameters of the yarn might be made to show the actual variation in the size of the yarns. The following method of obtaining the diameter of a yarn is one used by textile designers. "The square root of the yards per pound," deducting 5 per cent for surface fiber. The result gives the number of threads of yarn which will lie together in one inch.

Finding the diameter of 14's cotton yarn:

$26 \times 840 = 21{,}840$ yards per pound.

$14 \times 840 = 11{,}760$ yards per pound.

$\sqrt{}$ 11,760 = 108 less 5 per cent = 103. That is, 103 threads may be laid side by side in one inch, so that the diameter of a single thread will be 1/104 of an inch.

Finding the diameter of 26's yarn:

$\sqrt{}$ 21,840 = 147 less 5 per cent = 140. Then the diameter of a single thread of 26's would be 1/140 of an inch. The 5 per cent taken off for surface fiber is only arbitrary. The allowance for surface fiber would be much less if a combed yarn was used, and in the case of worsted and woolen yarns a much larger deduction would have to be made.

It is my opinion that 26's carded yarn is beyond the range of a 12 gauge machine, and for practical purposes it is not advisable.

EARLY EXPERIENCES OF A BOSS KNITTER.

EDITOR COTTON:

With all apologies to the popular song writer, "There's a Mill in the Heart of Maryland," where I once took a position as boss knitter and fixer for their cuff and ribbed tail department. It would be fair to all to state that this was my first position as boss knitter, and therefore I perhaps accepted conditions with better grace than I might have done, or would have done, after a greater amount of experience.

I arrived on a Sunday morning and went down to the plant with the superintendent to look over the rooms. I

knew I could do the work all right, but they were behind with this particular section and were running the machines night and day. The superintendent informed me on the side that he would see that the boys did their duty, and for me not to say anything to them for the first week or so. This was where my inexperience as head knitter came in, and I thought he was doing me a favor, but as will be indicated later, and as all old heads know well enough, this advice was bad business.

Things went very well for a few hours the first morning until I went into the office to get some orders, and when I came back a machine was standing. Asking what the trouble was, the knitter said it was hung up. I looked all around it, but could find no cause for the stoppage. I proceeded to take off the cylinder sections, thinking part of a needle had probably hung in a cylinder, but did not find anything. In my earlier experiences I had seen a great deal of trouble caused with butts of needles getting in behind the rising cam in the cylinder, and I thought perhaps this was the case here. Therefore I took out the rising cam, and found nothing but bad slots. The bottom of the cylinder was in pretty bad shape, and I took it down and cleaned it all up carefully. Thinking I had found the trouble, I put it back and tried to turn the machine, but it was still tight Then I knocked the pin out of the driving gear and turned the hand-wheel. On doing this, I felt like kicking myself for not doing it at first, for the trouble was in the shaft. After taking the gear over to the work bench and removing pulleys, I then drew the shaft from the bushings and found wedged in the bushing nearly the whole length of a dial needle. This was unexpected. It had evidently been driven in the oil hole while I was in the office. I found it pretty hard not to say anything, but I thought perhaps it was meant for a joke, and let it go at that. However, as it developed later, it was all done for a purpose.

Things then went all right for a day or two, and I thought everything had settled down to business; but one morning, one of the knitters called me over to a machine, and said there was something wrong in the cylinder. I saw before I put my hands on the machine that it was some crooked work. I took off the cylinder ring (it was a machine which did not have the section parts), and wedged in the cylinder was a needle, in a shape I have never seen before or since. It looked as though it had been put in bottom upwards, and the machine started up at full speed. The cylinder needed cleaning very badly, so I took it all down and carefully went over it. It took me longer to put it into shape than I had expected it would, and I was not more than half done with the cylinder when I heard a crash, and looked around in time to see one of the knitters throwing a belt off, and then go looking around the machine like a kid who was trying to hide some stolen candy. I went over and looked at the machine, and a feed or yarn carrier had been broken off even with the screw, and the bottom part dropped down on the dial needles, which broke about 250. I asked the knitter how it happened, but he claimed to know nothing about it. When the superintendent came in, I showed him this broken "feed," and he saw that things were going bad, but did not succeed in getting any more out of the boys than I could. There were no new "feeds" in stock, so the machine had to stand until they could order one and have it shipped in.

The next morning, one of the knitters came to the work bench and borrowed a hammer. I asked him what he was going to do with it, and he replied that the pin had dropped out of the chain gear. I knew it would only take a light tap or two to tighten the pin; so I thought he would have no excuse to do anything more. In about two minutes, he brought me the gear broken into two parts, as near the center as it could have been sawed. I thought more things in two seconds than I could have said in half an hour. As I started for the superintendent, I met him coming in, and he introduced me to a fellow that was considerably the worse for liquid refreshments, and could hardly stand still long enough to shake hands. He called me over to one side and said this was their "old man," and that he knew the business well. He further explained that this former boss knitter had been knocked out of the job he was expecting to take when he had quit, and now wanted to come back. I was not sorry to hear this at all.

I will say for the superintendent that he acted square with me in the matter, and wanted to put me in the packing room, but I told him I had rather have my week's pay.

I knew all this would be against me when it was found that I had apparently "fell down" on one job, and would make it hard for me to get another. However, I decided it would be better to leave at once and make the attempt. When I went home that night, the boss dyer, who was boarding at the same place, met me with a laugh, and explained to me the whole thing. He knew that something was working, but he did not know until that evening just how the scheme was worked out. One of the knitters was a relative of this former boss knitter, who had resigned from his position because he was refused a larger salary at this mill. He had reported to the superintendent that he was going to a job in a Southern state, but instead of going anywhere, he stayed around and conspired with this relative, who was the knitter, to see that things went to suit him. It was his intention to make whoever took the job "fall down" on keeping up the repairs and in running the room, so that he could eventually come back with an increase in salary—perhaps.

This was not written as a hard luck tale, or to excuse myself for any lack of perception which I may have had at that time, but merely to give young boss knitters an idea of what they are liable to get up against when they go to new jobs where they are replacing some man who has perhaps been in the mill for a number of years, and who has many friends or relatives still working there.

Cooperation with the superintendent is a good thing, providing the superintendent will really cooperate. A great many times the superintendent is in a rut and is afraid to take sides against any of the old men for fear of creating a disturbance and causing more trouble than is being already caused by the then present conditions.

I think a discussion department for knitters would be a valuable addition to the knitting department of COTTON, and I will be glad to not only read the experiences of others, with the various troubles that arise in every-day work around the knitting mill, but will also be glad to contribute some of my own experiences from time to time and explain how I overcome the difficulties. This is my first letter, and I have "broken the ice," so to speak, for the other fellows. I now hope to see many practical contributions submitted to this department. A cotton mill overseer advises me that he gets a great many good points from that practical discussion department in COTTON which is conducted for the benefit of the cotton mill man, and I see no reason why the knitting mill overseers cannot also exchange ideas with equally good results. Come on friends, and let us exchange some ideas and experiences! Boss Knitter (Tenn.)

DYEING, BLEACHING AND FINISHING.

THE MANUFACTURE OR ARTIFICIAL SILK FROM COTTON.

(*Contributed Exclusively to* COTTON)

BY H. R. CARTER.

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AFTER TREATMENT OF THE SPUN SILK.

Unless the silk has been spun upon the can spinning frame which slightly twists a number of filaments together as they are drawn off from the spinning nozzle, the next operation usually consists in putting a little twist into the untwisted strand of filament. This is done upon a throwing mill of a very similar design to that used for natural silk. Figure 15 shows a single band throwing mill, 5 reels long, containing 150 flexible spindles set at 5½ inch pitch. The reels above are fitted with two count

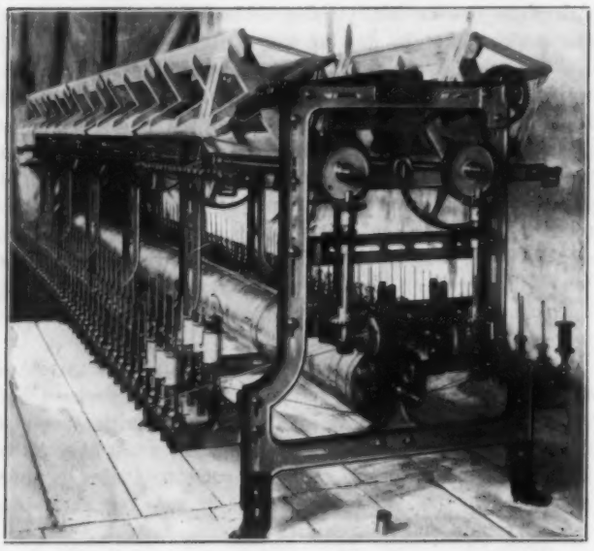


FIG. 15. A SINGLE BAND THROWING MILL.

motions to give skeins from 500 to 2,000 yards in length, while change wheels are provided to give from one to 20 spins per inch of twist. Figure 16 shows a similar machine more in detail, this particular machine being in addition, fitted with a means whereby the thread, may, if desired, be treated with water, acid or other liquid, as it passes through the machine.

It should here be explained that the used of a machine such as this, in which both the twisting and reeling operations are carried on simultaneously, is a recent departure, for many manufacturers still throw the filament together upon a mill more like that illustrated in Figure 19, the thread being wound up again in cheese form upon surface drums and subsequently reeled into hanks, upon a separate machine. These hanks are then subsequently treated.

The machine of which Figure 16 is an end elevation, is constructed with rotary bobbin carriers on spindles A mounted in a fixed spindle rail B with splash boards C on either side to catch the liquid thrown off from the material on the bobbins as they rotate. The rotary carrier or spindle A, imparts the desired twist to the thread T as it is drawn off the celluloid tubes or bobbins for reeling. The rotary bobbin carriers or twisting apparatus are driven by a drum D and bands "d" at such speed as will give the desired amount of twist.

At the top of the machine above the spindles, a number of independent reels E are mounted to draw the thread T from the bobbins A as they are twisted and reel them into hanks. These reels are constructed as in Figures

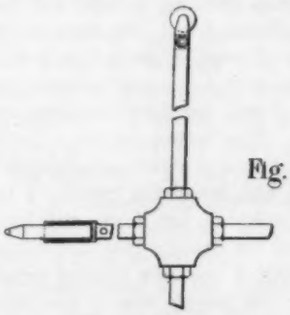


FIG. 17

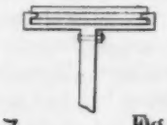


FIG. 18

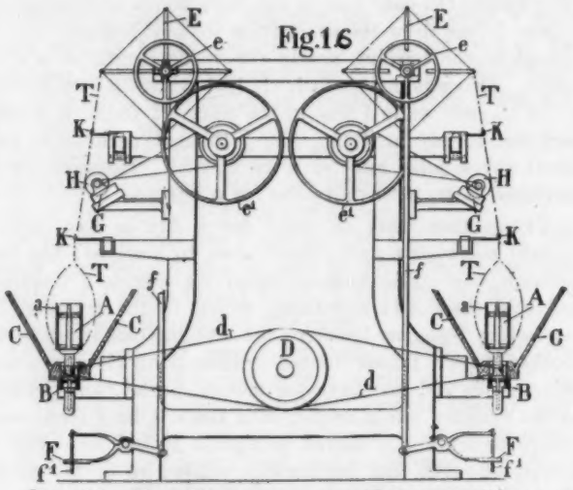


FIG. 16. END ELEVATION OF A THROWING MILL.

17 and 18, with telescopic or collapsible arms which have rollers mounted thereon. Each reel is driven by a separate friction pulley "e" thereon, from a corresponding friction pulley "e'" mounted on a central shaft, each reel may be stopped for piecing up the end or for other purposes, by lifting the pulley "e" out of contact with the pulley "e¹." The reel bearing is lifted by a foot lever F and connecting rod "f," the former being fitted with a latch "f'" to hold it depressed. On releasing the foot lever the reel is again started.

Between the rotary bobbin carrier A and the reel E, troughs G to hold damping or treating liquors are placed. These are provided with rollers H on guides rotating in the liquid, or otherwise guides are provided to direct the thread through the liquid in the trough.

The threads are guided from the bobbin to the reel by guide eyes K placed above and below the damping trough G.

The splash boards C protect the operatives and the machinery against the corrosive action of the liquid thrown off during the twisting of the threads. Unless twisted up at once from the spinning table, the tubes or bobbins of filament should be kept moist by means of damp cloths or immersed in an acidulated bath.

Unless men are employed to conduct the twisting operation during the night, the problem of how to preserve the product spun at night until it can be twisted and reeled up during the following day is a serious one for the manufacturer of artificial silk. Although means may be adopted to assist in keeping the silk from growing soft and rotten, the silk will always be at its best when twisted and reeled up directly as spun.

Reels used to hold the thread while transporting from the bobbin to the bobbin throwing or twisting mill, are usually short, say, 12 hanks, and are run at a high speed, drawing the threads endwise from the cross-wound tubes or bobbins. Cross reeling is preferred to parallel reeling. The hanks, usually 47 inches in circumference and of 3,600 threads, should be loosely leased in three or four places to avoid entanglement in the washing out and finishing processes.

Under the Glanzstoff process in which the silk as spun is wound upon glass cylinders revolving in a dilute sulphuric acid bath, the doffer carries the glass cylinders full of silk impregnated with sulphuric acid, on wagons into an adjacent room where they are washed. In this room the cylinders are placed on wooden pedestals and the silk is washed for six hours in acetic or formic acid mixed with ammonia and the whole well diluted with water. Details of the operation and compositions used in washing are as follows:

The doffers carry the cylinders or wagons which run on rails, and place them on tables in two heights. The washers find the cylinders on the tables and place them on pitch pine supporters. On each pedestal or support, six rows of cylinders are placed, one above the other. To the right in the room are five earthenware reservoirs containing the composition with which the cylinders are to be washed. A bent glass tube conducts the washing liquid and branching out into two pipes, stretches the whole length of the wooden support. To these glass pipes are attached at regular distances for each row of six cylinders, small rubber pipes with ebonite cocks on their ends which hang in celluloid gutters. The contents of the reservoirs thus reach the gutters and fall drop by drop on the silk or the glass cylinders in each row. After flowing over the surface of the silk on the upper cylinders, the drops fall upon the cylinders underneath and so on to the fourth row. The cylinders in the top row on which the silk has been washed for six hours are removed from their supports by the washers, to shorter supports where the silk is soaped.

The cylinders of the second row are now raised into the first row and those of the third row into the second row, and so on, so that the last row disappears and is replaced by fresh bobbins or cylinders. Every hour the top row is removed for soaping and the others raised.

There should be celluloid gutters between each row of cylinders, which should also be given a quarter turn each time they are raised into the row above. The usual washing compositions are as follows: Eighty pounds of ammonia are emptied in the earthenware mixing reservoirs together with a like quantity of citric acid at 80 per cent. The mixture is then diluted with water to make up 275 gallons. From the contents of this reservoir a quart is taken and emptied into each of the five wash-water reservoirs full of water. These vessels empty themselves in one hour and it is thus easy to calculate how long the mixture prepared in the first reservoir will last. As we have said, this reservoir contains 275 gallons and if five quarts are required per hour for the five wash-water vessels, the mixing reservoir will be empty in 275 times 4 divided by 5, which equals 220 hours.

A newer washing composition which gives excellent results may be prepared as follows: Empty three carboys of formic acid into the mixing reservoir and make up to 275 gallons with water. Five pints of this preparation are then taken for each of the other five reservoirs which are also filled up with water.

It may be ascertained if the silk is sufficiently washed out by the following test: One-half ounce of chloride of barium is dissolved in a quart of water. A few drops of this solution are allowed to fall into some of the washing water collected as it falls from the cylinders of silk. If the silk is properly washed out the liquid remains clear, if not it becomes cloudy, an insoluble precipitate of sulphate of barium being formed.

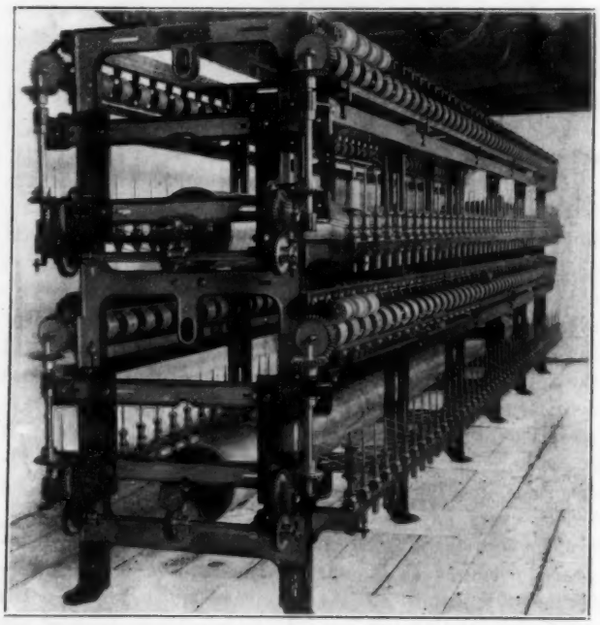


FIG. 19. AN OLDER STYLE MILL WITHOUT REELS.

Since the purity of the washing and soaping water is of the highest importance, all such waters should be filtered and softened.

After the silk has been washed for six hours upon the glass cylinders, these cylinders are placed, as we have said, upon shorter supports and washed for three or four minutes with soapy water and passed through double doors into the drying rooms. The soap used should be pure olive oil or Marseilles soap (80 per cent guaranteed pure oil and alkali), and a permanent lather formed with water of condensation kept at 120 degrees Fahrenheit. A gallon of ammonia and a little borax is added to 275 gallons of water and 11 pounds of soap, and the whole is stirred for

some time with a stick, the mixture should be kept at a temperature of 120 degrees Fahrenheit, not only while the soap is being dissolved, but while the silk is being treated. To wash at this temperature, the celluloid gutters are replaced by some of wood or glass. Neither can ebonite cocks be advantageously used, it being found better to use screw clips on a rubber pipe, by means of which the supply of soapy water may be regulated. The object of the soap is to render the silk supple and thus make it more easily reeled. The floor of the washing and soaping room should be well sloped off to allow the water to run away into a gutter or drain. The cylinders then pass to the drying room where they remain for from 12 to 15 hours under a temperature of 130 degrees Fahrenheit. In each drying chamber nearly 6,000 cylinders may be placed on shelves or counters placed one above the other. Each cylinder contains about one ounce of silk. The temperature should not exceed 140 degrees Fahrenheit, for at 190 degrees Fahrenheit the silk is apt to be spotted with browny red. The cylinders on the upper shelves dry first, so that in filling the room the lower shelves should be first filled while the steam is on. The drying chamber or stove should have two doors, one being for the entrance of the cylinders and the other for their removal. The room should not be allowed to cool off, but fresh cylinders should be brought in by one door while the others are being removed by the other door.

Great care must be taken in every stage while the silk is upon the glass cylinders. If tossed or tangled by handling, the silk can not be wound off and must be cut off and thrown to waste. As the cylinders are usually carried about by boys, these should be well looked after by an overseer. If great care is not taken in the transport of say 5,000 cylinders per 10-hour day, it is easy for 100 of them to be damaged. With one ounce of silk on each cylinder, six pounds of silk, at say, $2.50 per pound, representing approximately $15, may be lost. Frequently it is not only the silk which is damaged, but the glass cylinders; and in a large factory it is not unusual for 50 to be broken every day.

The dry silk is next conditioned in a cool damp atmosphere, produced as in other textile factories. When conditioned, it winds off the cylinders much better. The winding operation consists in winding the conditioned silk from the glass cylinder onto smaller wooden spools or bobbins, which then pass to the twisting frames. The winding machines are composed of a wooden table upon which the glass cylinders are placed on end at suitable distances apart. The thread, as it winds off, passes over a wooden guide fixed on a bar which extends the whole length of the machine. A thread guide fixed upon a lath supported by friction rollers has a reciprocating motion before the wooden bobbin. This bobbin is fixed on a spindle by means of a thumb screw. The spindle has a wooden boss which rests upon a driver flange, thus turning it by friction, as in the hank winding machine, Figure 20.

The full bobbins are sent to the twisting rooms to be twisted or milled on bobbin boards or cages usually containing 21 bobbins each. Each hand has her cage, which is first weighed full of empty bobbins and then with full bobbins, so that the hand may be paid by piece work. A girl looks after five or six bobbins, while there are 55 or 60 bobbins on a frame. Each winder can wind about seven pounds of silk per day and is paid about eight cents per pound for winding 100 to 120 denier silk, six cents per pound for 120 to 160 denier silk and five cents per pound for 160 to 200 denier silk.

When the silk has been wound upon wooden bobbins the latter are taken to the twister room when they are placed upon vertical spindles driven by bands as in the machine, Figure 19, or else by the friction of a belt which passes around a drum lying horizontally. The twisted thread first passes through a fixed thread guide and then to another guide fixed in a reciprocating bar. The friction or winding bosses are driven by two bevel wheels, themselves driven by a wheel which gears with one or the other of a set of cone wheels, according to the degree of twist which is required.

Other manufacturers of artificial silk from similar solutions, twist or reel the silk from the spinning tube in its unwashed-out condition and then wash out and treat the hanks, which they finally dry. To carry out this process the hanks are taken from the reel, which must be of copper and glass, and soured in becks or tanks of water acidulated

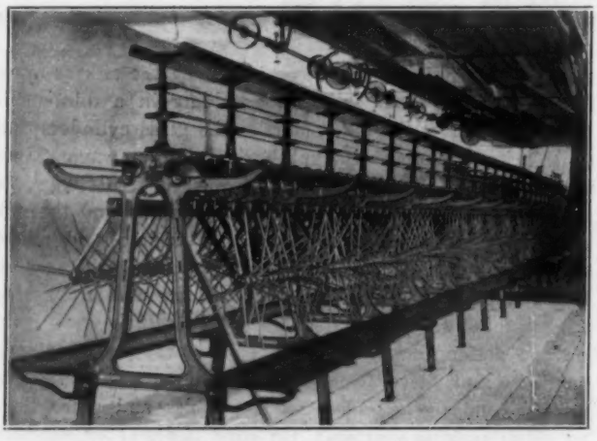


FIG. 20. HANK WINDING MACHINE.

with hydrochloric acid to 2 degrees Tw. The hanks are spread upon glass rods and hang suspended in the bath and are repeatedly turned. They are then twice washed in similar becks or tanks of pure water, the last water being tested for traces of copper with ammonia. When the copper salts have been entirely removed, the hanks are squeezed and hydro-extracted to remove moisture and are then shaken out and spread on tension frames to dry. When dry the hanks are sometimes treated in a one-half per cent Turkey Red oil bath, or given a scroop in a one per cent acetic or tartaric acid bath, after which they are hydro-extracted and dried in the stove or drying room upon poles.

Another method consists in washing in three hot waters, passing on to a soaping bath prepared as previously described and finally giving a two per cent acetic acid bath.

Hubner advocates treatment of the hanks with a hygroscopic substance, glycerine for instance, in a slightly acidulated bath. The hanks are first washed with Marseilles soap and then treated with Turkey Red oil and finally immersed for a few minutes in a bath containing one per cent of glycerine and a little acetic acid. The hanks are passed through the hydro-extractor and dried without rinsing.

Washing machines with porcelain rollers which turn

alternately in one direction or in the other are sometimes used for washing and treating hanks of artificial silk.

Another process of finishing the silk consists in washing the hanks with oxalic acid solution, 8 ounces per 100 gallons. This wash is said to give a whiter silk than when acetic acid is used.

Collodion silk as reeled is very combustible, owing to the presence of nitrocellulose, and has to be treated in order to make it safe. Reducing agents such as hydrosulphurous acid, ammonium sulphydrate, ammonium hydrosulphide, nitrate of soda, etc., are employed to act upon the nitrocellulose, which is thereby reduced to totally or partially denitrated cellulose according to the length of the reaction. Alkaline hydrate may be preferably employed, the skeins of silk being immersed in a solution of sulphydrates for several hours and then thoroughly washed and dried. The denitrating process often gives the silk a rather dirty color, and in order to improve this it is necessary for it to undergo a bleaching process such as is described further on.

The strength of artificial silk may be increased, especially when wet, by treating with aldehydes, polymerides of these before washing and drying. The following is the method of treatment:

Impregnate the silk with its own weight of a bath containing formaldehyde (40 per cent solution), 5 to 25 parts; lactic acid 80 per cent, 5 to 15 parts, and water 90 to 60 parts. Then place with or without vacuum in a closed receiver, in the presence of calcium chloride or vitriol (a sufficient quantity to absorb all moisture). At the same time raising the temperature to 100 degrees Fahrenheit.

Another impregnating liquid may be composed as follows: Formaldehyde (40 per cent solution), 5 to 20 parts; chrome alum, 5 to 15 parts, and water, 90 to 65 parts. The silk being treated as before. After this treatment the silk is finished by washing and drying.

Similar results may be attained by treatment of a 6 per cent solution of formaldehyde containing also sulphate of allumina and acetic acid and the hanks being then dried at a low temperature in the presence of sulphuric acid followed by a thorough heating for many hours at a temperature of 140 degrees Fahrenheit. The cost of this treatment is about 4 cents per pound. Silk thus treated does not dye so readily.

When steeped in a solution of acetic acid and then dried, artificial silk possesses the quality well known to the trade called "scroop," *ie.*, a crisp handle and crackle when compressed.

For a similar reason silk dried under tension has a better lustre than if dried without tension and allowed to curl, the lustre of all silk is improved by re-winding the hank from the driers or stoves onto bobbins upon a hank winder such as is shown in Figure 20. Under ordinary circumstances the finished hanks are softened by pinning or twisting upon a horn, being examined at the same time and knots and fluff removed. The hanks are then deniered or weighted to ascertain their correct yarn number, the different weights being kept separately and bundled up in ten-pound bunches for shipment to the users.

The unit of the International Silk Association is a skein of 500 meters weighing 1-20 gramme. This is known as one denier. Forty denier silk therefore weighs 40 divided by 20, equals 2 grammes per 500 meters. The Manchester system of indicating the counts is by taking the weight of a 1,000-yard hank in drams. Thus, if 1,000 yards weighs 3 drams, it is termed 3 dram silk, etc. To find the equivalent Manchester number from the Denier scale, multiply the latter by .057 and vice versa multiply the Manchester number by 17.5.

(*To be continued*).

MARKING GOODS IN PROCESS.

(*Contributed Exclusively to* COTTON).

BY S. W. B.

Almost all articles on bleaching state that the goods should be stamped with some substance which will withstand the action of the bleaching process, so that the various grades may be distinguished in every part of the bleaching and finishing process. Lampblack and tar are most often mentioned; tar being used almost entirely.

To the man who has worked around bleacheries all his life, there isn't anything in the whole process that is any simpler than "tar-marking the goods," but to nine out of every ten men employed in the bleachery, outside of the grey-room, roofing-tar or asphaltum is the tar always thought of; that is, if they give it a thought at all.

Roofing-tar can not be used. It dissolves with difficulty in turpentine and also dries out too quickly when poured on the stamping pad.

The tar which should be used is gas or coal-tar, which is a liquid, and obtained in large quantities as a waste product in the manufacture of illuminating gas, and which, when obtained from certain grades of coal, is the source

Fig. 1 Fig. 2

of all coal-tar or aniline dyes and the much abused "coal-tar drugs."

In using, the tar as it comes from the gas house should be thinned down with as much turpentine as can be used and still have the mark show black. Too much turpentine makes it so thin that only a brown mark can be made, while if enough is not used the mark on the goods will not dry out, and consequently will stain other goods. Equal parts of the tar and turpentine seem to give good results. The amount of thinning depending also to some extent on the severity of the bleach. The heavier the mark we can get without having it "mark-off" onto other goods, the plainer it will be after bleaching.

A piece of felt is tacked on the bottom of a shallow box eight or ten inches square and a half inch deep and saturated with the thinned down tar. Pouring the thick tar onto the pad and then dropping turpentine onto it to thin it down does not give good results. It dries out too quickly, so that instead of being able to use the pad half a day or so, we have to replenish it every hour, besides keeping the stamping stencils all gummed up.

Copper marking stamps can be made to give either the

outline of the figure or letter, such as Fig. 1, or a solid black figure, as in Fig. 2.

Figure 1 is usually employed in knitting mills and similar places where a severe bleaching process is not used, because it gives a light, clear outline which dries quickly and so has no chance to smear other valuable webbing.

Figure 2 would be used where a mark was wanted which would stand a caustic or a couple of soda-ash boils and still be legible after bleaching.

The mark should be placed as near the end of the piece as possible. In a knitting mill it would be placed about an inch from the end of the roll; cotton piece goods, two or three inches from the end; piece goods being torn quite often at the seam during the manipulation.

The stamps are made from copper with the letter or figure about 1 inch long.

OILS AND SOAPS IN TEXTILE MANUFACTURING.

Oils and soaps are very largely used today in the bleaching, cotton dyeing, printing and textile industries generally. Soap is a chemical compound or mixture of chemical compounds resulting from the interaction of fatty oils and fats with alkalis. Soap is believed to have come to the Romans from Germany, and it is thought that the detergents in use in earlier times, and mentioned as soap in the Old Testament, bear reference to the ashes of plants and other purifying agents. It is as a purifier that soap is practically employed in the industries, and it seems first to have been made from goat's tallow and beech ash. In the thirteenth century the manufacture was established at Marseilles and in England during the next century. Chevreul, by his chemical investigations conducted at the commencement of the nineteenth century, revolutionized the processes and extent of the manufacture. These investigations were on the fats and oils. Another occurrence which aided greatly in this was the invention of Leblanc's process for the manufacture of caustic soda from common salt. Marseilles has long been recognized as the most important center of the soap trade.

The general characteristics of a soap are a certain greasiness to the touch, ready solubility in water, with formation of viscid solutions which, on agitation, yield a tenacious froth or lather, an indisposition to crystallize, readiness to amalgamate with small proportions of hot water into homogeneous slimes, which, on cooling, set into jellies or more or less consistent pastes. Soaps give an alkaline reaction and have a decided acrid taste in a pure condition—a state never reached in practice. They have neither smell nor color. Almost without exception, potash soaps, even if made from the solid fatty acids, are soft; and soda soaps, although made with fluid olein are hard; but there are considerable variations, according to the prevailing fatty acid in the compound. Almost all soda soaps are precipitated from their watery solutions by the addition of a sufficiency of common salt. Potash soap with the same reagent undergoes double decomposition, a proportion being changed into a soda soap with the formation of potassium chloride. Ammonia soaps have also been made, but with little commercial success.

Soap, when dissolved in a larger amount of water, suffers hydrolysis with formation of a precipitate of acid salt and a solution containing free alkali. The reaction, however, is very complicated. Chevreul found that a neutral salt soap hydrolyzed to an acid salt, free alkali, and a small amount of fatty acid. Rolondi in 1885, however, regarded a neutral soap as hydrolyzing to a basic salt soluble in both hot and cold water and an acid salt insoluble in cold and sparingly in hot. Chevreul's views were confirmed in 1894 by Kiafft and Stern. The extent to which a soap is hydrolyzed depends upon the acid and upon the concentration of the solution. As to the detergent action of a soap, Berzelius held that it was due to free alkali liberated with water, but this view is said by many authorities to be incorrect, and they point out in support of this that upon Berzelius' theory weak cold solutions of soap, in which the hydrolysis is considerable, should be the best cleanser, whilst experience points to the use of hot concentrated solutions.

The oils and fats used by manufacturers of soap are obtained from both vegetable and animal sources. No great difference exists between an oil and a fat; it is purely a question of climate, or rather of temperature, as to whether a particular body makes its appearance in a solid form as a fat, or liquid as an oil, at the ordinary temperature of the place in which it is. That it is merely a question of temperature is proved by the fact that if tallow or palm oil or cocoanut oil be kept in a sufficiently warm place they are converted into liquids, while, on the other hand, by artificially cooling cottonseed oil or lard oil, they are solidified, and are then in no way distinguishable from a solid fat.

The oils and fats are lighter than water, their specific gravity ranging from 0.878, which is that of sperm oil—the lightest of natural oils—to 0.965, that of castor oil. In water they are quite insoluble; on shaking up with it they form an emulsion, in which the oil is distributed throughout the body of the water in the form of minute globules; on standing, the oil gradually separates out and rises to the surface. On being heated to 500 to 600 degrees Fahr., oils decompose, and under ordinary atmospheric pressure they cannot be distilled unchanged. The oils are compounds of three elements—carbon (C), hydrogen (H), and oxygen (O), the proportions varying in different oils. For linseed oil these are: Carbon, 77.440 per cent; hydrogen, 11.10 per cent; and oxygen, 11.50 per cent.

Almost any fatty substance can be employed in soap making, but the choice is naturally restricted by the price of fat, and also the quality of the soap desired. The most important of the animal fats are those of the ox and hog, and of the vegetable oils cottonseed and cocoanut; it is to be remembered, too, that resin, though not a fat, is also important in soap making. Ox and sheep tallow, with the addition of resin are the primary materials for making the yellow or primrose soaps. These tallows are often adulterated. The cheaper mottled and brown soaps have for their basis bone fat obtained by treating bones with superheated steam or other methods. In the silk industry soap has long been used in the ungumming, or boiling off, of the raw silk and in many processes of silk dyeing. In the woolen industry it is employed in milling or fulling of woolen fabrics, and also in the scouring and cleaning of wool. It is largely used in cotton manufacturing; also in the finishing and cleaning of cotton, and in the manufacture of jute, linen, hemp and other textile fibers. Soaps

that lend themselves well for scouring woolens will be found unsatisfactory to employ in operations in a calico printing works or to make use of for the purpose of boiling off silk. Special soaps and oils suit special processes made use of in the textile industries, and spinners, weavers, bleachers, dyers, calico printers and finishers, etc., will find it greatly to their benefit to study the matter closely and ascertain definitely which is the best soap and oil to make use of in the different stages connected with the particular industry in which they are engaged at which these agents require to be utilized. Two descriptions of soap are used in commerce, hard soap and soft soap, and both are these are employed in the textile industries. Quite a number of varieties of soaps are made, and the purposes to which they are applied are varied. The materials employed embrace a considerable range of oils, fats and other bodies, and the processes employed in their production undergo many modifications.

As regards processes of manufacture, soap may be made by the direct combination of fatty acids separated from oils with alkaline solutions. Calico printers use soap in large quantities in the final processes of washing and cleaning the printed cloths, and, so far as the alizarine and mordant dyes are concerned, soap helps to brighten these and to fix the color. A soap liquor of about 1½ pounds soap to 50 gallons of water is the one usually employed. The most suitable soaps to use for dealing with printed calicoes and similar goods should be readily soluble in water; so oil soaps offer the best advantages. They require to be perfectly neutral, as any free alkali is liable to alter the tints of some colors, and causes others to run, which is a serious fault. Further, they should not leave a disagreeable smell behind them. Marseilles soaps answer the purpose best. These are, as a rule, of a green color, being manufactured from the commoner grades of olive oil. They contain 62 to 64 per cent of oil, with an equivalent proportion of alkali and water. Tallow soaps must not be used. The soaps employed should, further, not contain fillings of any description.

The soaps used by silk throwsters for putting in the troughs in which they steep the raw silk are expressly made for the purpose in some cases. Great care has to be taken in silk washing, as it only requries the gum to be softened so as to cause the silk to wind free, and great care is taken by the throwsters not to steep the silk in overheated suds, as there is a difference of 15 degrees of heat in the climates where they are made. An authority says that as a mild scouring agent for the better classes of wool, potash or soda soap is decidedly the best. Satisfactory results are always obtained with these if the soap is of good quality and free from excess of caustic or carbonated alkali. Other things being equal, the most soluble soaps are to be preferred, such as potash soaps or soda soaps made from oleic acid. An average soap solution may contain 30 to 50 g. of soap per litre of water (4.8-8 oz. per gallon). An addition of ammonia to the soap solution is frequently made for the purpose of increasing its detergent properties. An important consideration to be remembered when using soap is that the water should be as free as possible from lime and magnesia to avoid the formation of lime and magnesia soaps. Olein and resin soap probably assists emulsification in the scouring bath. Sodium carbonate is used with or without soap. According to the same authority, for such goods as weighted black silk oleic-acid soap is the best to use; but for silk which is to be dyed in light colors, or to remain white, a good olive oil soap is preferable.

Mottled soap is a curd soap prepared from kitchen fat or bone grease, and this always carries with it into the cooling frame a considerable amount of colored impurity, such as iron sulphate, etc. When it is allowed to cool rapidly the coloring matter remains uniformly disseminated throughout the mass; but when means are taken to cause the soap to cool and solidify slowly, a segration takes place; the stearate and palmitate form a semi-crystalline solid, while the leate, solidifying more slowly, comes by itself into translucent veins in which the greater part of the coloring matter is drawn. In this way curd mottled or marbled soap is formed and such mottled appearance was formerly highly valued, as it was generally taken to indicate freedom from excess of water or other adulteration, because in mottled soaps the impurities are either washed out or fall to the bottom of the mass in cooling. Today, however, the mottled soaps, blue and gray, are produced by working coloring matter—ultra marine for blue and manganese dioxide for gray—into the soap in the frame, and mottling is very far from being a certificate of excellence of quality.—*Indian Textile Journal.*

Action of Ozone on Cellulose.

Ozone in concentration of 1 to 2 per cent rapidly attacks cotton, forming a cellulose peroxide and an acid derivative, together with some carbon dioxide. The peroxide is decomposed at 80 degrees C. The acid may be removed by boiling with water or digested with tenth normal alkali. The neutral fiber residue then obtained is an oxycellulose. The acidity and the amount of carbon dioxide produced during a treatment varying from 1 to 20 hours have been measured and the constants of the oxycellulose determined and compared with typical oxycellulose. The ligno cellulose jute is not appreciably affected by ozone unless water is present. In that case it is oxidized in the carbon dioxide, acetic and formic acid and complex non volatile acids which yield furfural. The quantitative measurements of the progressive action of the ozone show that the lignon group is rapidly attacked in the first three hours, after which the action becomes slower, the residue being then oxidized uniformly. The lignin reactions cease when the loss of weight is about 33 per cent. Direct evidence of ozonide formation has not been obtained, although the formation of acetic and formic acid appears to be due to the decomposition of some product formed in the first instance by the action of ozone.

Reserving the Selvages in Cotton Piece Goods to be Dyed Aniline Black.

Cotton yarn is treated at 25 to 30 degrees C. with a mixture of 200 grams of petroleum benzine of high boiling point, 400 to 500 grams of paraffine wax of melting point 72 to 75 degrees C., and 400 to 500 grams of precipitated calcium or barium hydroxide and the sized yarn is used for making the selvage of cotton piece goods. If aniline black is subsequently produced on these goods, the paraffine wax acts as a mechanical and calcium hydroxide as a chemical reserve to the padding liquors so that the selvage, after ageing and chroming, remains white. High temperatures must be avoided in the preparatory processes previous to dyeing.

Practical Problems Discussed by Cotton's Readers

We invite our readers to make use of this department for the discussion of any and all problems arising in the mill or the finishing plant. Questions, answers or letters need not conform to any particular style and will be properly edited before publishing. The editors do not hold themselves responsible for any statements of opinion or fact which may appear in this department unless so indorsed. This department is open to all.

QUALIFICATIONS FOR A WEAVE ROOM OVERSEER.

EDITOR COTTON:

Anyone who is at all familiar with cotton manufacturing will admit that the success of a cotton mill depends on the overseers, and to a great extent on the overseer of the weave room. The quality of an overseer depends on his ability to do good work—as large quantity of good work as circumstances will allow, and at the least possible cost. In the weave room the finished product is cloth, and it should be the aim of every overseer to get every yard possible. Subject to the above conditions, it is a mistake, however, to suppose that it takes years and years of hard work to qualify a man for this position. It must be admitted that for some men it does take that long, and some are really never qualified; it depends altogether on the man.

It is absurd to suppose that a man, well educated, with a taste for reading and study, and not afraid of work, will take as long to advance as one who has spent the time in the mill when he should have been in school, and who strives to rise through main strength alone. It is a deplorable fact that so few educated men choose mill life as their business. There are plenty of young men who, after leaving school, are willing to work in the office, wear a standing collar and direct the movements of others, but what we need are educated young men who are not afraid to doff a spinning frame or run a set of looms. These are the ones who will make intelligent and progressive overseers and superintendents.

Education, however, will not take the place of common sense or experience. Do you begin to "get me"? No man can make a successful overseer who is not able to do anything he requires others to do. But it is not necessary for him to spend a lifetime acquiring that knowledge. I know of a man who, when applying for a position as overseer, stated that he had woven eight years, fixed looms ten years, and had been second-hand five years. He did not make near as valuable an overseer as his successor, who had been in a weave room only five years. The difference was simply this: The first man worked his hands, while the second used his brains. The second man never saw an effect without looking for the cause, and was not satisfied until he found it. He took several textile papers and read them carefully, and when a position was open he was ready for it. We must never lose sight of the fact that the highest priced men are paid for what they know rather than for what they do.

The best overseer is not the one who is always in a hurry, who never has time to do anything thoroughly, who talks the loudest and brags the most. He must have common sense and good judgment, perfect control of his help, as well as have their confidence, both as regards a man and a workman. To do this he must understand his help. Human nature differs as much as inanimate nature. A good overseer will know just how to approach every one in order to get the best results. To one he will be kind and obliging, and to another apparently careless and indifferent, while a third may require the most careful watching. In other words, he should be "boss" of his department without using partiality. Keep wide awake and see that everybody in his employ does likewise.

Second hands should also set an example for their help to follow. Superintendents and managers often wonder why it is that with two mills situated perhaps in the same town, having similar machinery and manufacturing the same class of goods, at the end of the year one will pay a better dividend than the other. Of course, they know it is in some part of the management, but exactly where they are unable to determine. In looking over the possible causes, they are very apt to overlook little details, which, in the long run, make a vast difference.

The writer has traveled over most of the cotton manufacturing territory, both North and South, and has studied the conditions very carefully, and feels competent to discuss weave room conditions especially. Poor management is always more or less the cause of bad conditions and the scarcity of good, competent, reliable help. Furnish some inducement for your help. Try to educate them to believe that you appreciate the interest they take in making your business a success. Promote the ones that prove worthy of promotion. Brighten up their spirits. Cheer them up and make them feel that they have something to live for. Kind words and good advice prove more valuable than storming and swearing at everyone who happens to make a mistake. Remember that you was once just as ignorant, perhaps, as any of them. If so, how did you secure the position you now hold? Did someone "beat" it into you with a club, or was it good, kind advice and proper training, reading good books and minding your own business that qualified you for the position? If you are not qualified for the position, how long do you expect to hold it; Perhaps you may "bluff" along for a while, but as soon as the man above you finds out what you are you will be looking for another position, and there is no doubt that it may require more time for you to get it.

The next subject I write on will be on "Loom Fixing." The writer will try to point out some of the good and bad qualities of fixers and the causes for a loss of production.

The Traveler. (Georgia.)

An international agreement to reduce the output of cotton mills is said to have been suggested by the Italian Textile Industrial Association, of Milan, in a recent circular addressed to cotton manufacturers' associations in all parts of the world. This policy is proposed as a remedy for the crisis in the textile industry in Italy, Austria and other countries.

ENDS RUNNING OVER ON FLY FRAMES.

EDITOR COTTON:

To understand the building motion on the English make of fly-frames is an acquisition to a fixer or carder, and is very necessary to prevent ends running over or under. I think that the friendly controversy between "W. B. W." and "Wash" is only an earnest effort to bring out other opinions on the same subject. For my part I am sure they are both wrong.

For instance, "W. B. W." in the November issue of COTTON says: "If the latches were round and if the rocker was round, when the rail got high enough for the screw to life the latch, it would change at a certain point and no other, and would always do so." How does he know? He certainly can't tell by watching it change. I suppose he meant to tell us the truth, so we will call it a technological inexactitude on his part.

I claim the motion catch or latch does not change at a certain place when they are worn round, as there is then *no definite place to change,* and they are liable to change either a little too soon, which would spoil the looks of the bobbins, or a little too late, which would cause running over. Undue vibration, such as rail couplings being loose and shaking, which would be transmitted to the reversing screws through the poker-bar, as the bar double-slide bracket is connected to the carriage, wuld tend to release a latch at the wrong instant.

In the December issue I see that "Wash" wants us to believe that rubbing the end of the latches and rocker with emery cloth will remedy the trouble. It may do this, but only temporarily. It gives it a better grip or bite for a while, but it is not mechanical, as it helps, later, by shortening an already too short latch, to cause the very trouble he asks us about in his next to the last paragraph, that is, the rail or carriage changing before the completion of the lift. Nearly always when this has happened, it is caused by the motion catch wearing too short to throw the reversing bevels in gear correctly, consequently the rail drops, but often the reversing bevel will slip a little and take hold again. Sometimes it may run three or four days before it occurs again, or it might happen at the same identical place every set, probably by reason of the teeth being worn more on some part of the reversing bevels, or the bevel gear itself being a shade out of truth; perhaps too much play at the end of the connecting rod, where it goes on the stud. This is a place, by the way, which is very often neglected by the oiler if not especially pointed out, thereby wearing the stud, which is a contributing factor to the reversing bevels not working correctly.

To fix this trouble, first throw off the connecting rod from the builder and put on a new motion catch, being careful to see that it is not too long. With the rod off, you can easily change the latches by hand. When you have the new latch nicely fitted, put the rod back on and see if it throws the reversing gear into mesh deep enough. Now change the other catch and also make that right. Of course if you put them too deep in mesh it will be apt to break the teeth of the small strike bevel, as it has a lot of work to do. Next see if the motion-catch springs are in good shape. If this work has been done correctly it will be impossible for the rail to change, except at the end of the lift. It often happens that when the catches are worn a little, such wear will not effect every end: one or two will run over or under and break; some will run over without breaking; and sometimes the frame will run all right for a time.

Some other causes are the cones of bobbins being unequal on the top and bottom. It is a fact that the more taper or cone to the bobbin the less chance there is for running over. If the poker-bar is not level when the rail is in center of the lift there will be more taper on one end of the bobbins than on the other. To remedy this, loosen up the reversing screws and after leveling the poker-bar in the center of the lift, by moving the tumbler bracket up or down, as required; start the machine and stop it where you desire it to be changed. Then turn the reversing screw down until the motion catch changes, and lock the screw. Repeat on the other end of the lift with the other reversing screw. Sometimes the speeder-tender will force the poker-bar too far back when turning the rack back for doffing. This will make the lift longer and also make the cone shorter, so it is well to notice this while doffing and allow the space of a finger, at least, from the end of the poker-bar to the end of the double slide bracket. A balance weight may be touching the floor during the first few lifts of a set, and when taking hold at first it is liable to lift the rail a shade just at that point and cause running under. What would "Wash"' do in a case like this, rub the bottom of the weight with emery cloth, or take a link out of the chain?

Sometimes an empty bobbin, when first put on the collar, will not drop low enough, either through a little fly or dirt being in the bobbin, or because it does not fit just right on the pin on the small bobbin gear. After the bobbin gets heavier or when machine is stopped for some reason it will drop lower and then run over the top. Too much back-lash in the gears driving the lifter rail will cause both running over and under. Always see that there is a little clearance between the tumbler and the top of the weight-hook (I am now speaking of Howard & Bullough frames), otherwise there will be too much work thrown on the cone-belt just before the changes take place, which will overload it, and cause the ends to run slack at that point and sometimes odd ends will break or run over.

Finally, if you get the ends of the bobbins right the rest of them will generally take care of themselves. Do not forget that a low spindle will give the bobbin it makes an unequal cone. It is a good idea, when everything is running good, to go and visit awhile with the building motion as it is the most intricate part of the mechanism of a frame, and you get a mighty small amount of satisfaction in taking one apart if you do not know exactly what you are trying to do.

Lance, (Michigan.)

SOME FINISHING PROBLEMS.

EDITOR COTTON:

I have been reading the various papers in COTTON on cloth room work and finishing, and have enjoyed them very much. So far Mr. Fallin has given us a very comprehensible system of book forms, etc., but I am anxious to know if he is going to continue this beyond *forms* and tackle some of the real problems of practical value, such as handling the machines and the methods of doing the many things peculiar to cloth rooms and finishing plants. I hope he does, but in the meantime I confess I am getting a bit impatient, and am going to bring some of my experiences

and problems in real finishing up before your readers, with the idea of both helping and being helped.

Once in my experience as an overseer I was with a mill that, for a short time prior to my arrival, had accumulated several hundred cases of ginghams, chambrays, etc., with an objectionable finish. As I remember it now, the goods were too hard and stiff, too much starch with too little softener. I suggested a remedy like this: Take the goods down and lay in loose folds or plaits on an improvised nip roll and plaiter that could have been made under my direction by the shop mechanics at a cost of a very few dollars. After plaiting, I proposed to run these goods again through a new and proper size over the regular machines, drying rolls, tentering machines, calenders, etc.—in other words, to refinish.

In this suggestion the management opposed me and said the idea was an impossible one, claiming that the old size would not dissolve in passing through the vat. I contended that it would, and that only an excess of softening compound to the new size was necessary to give us approximately the same finish that we were then receiving, and that by a little experimenting I could duplicate the present finish so closely that we could sell these goods to the regular trade as first-class goods. Needless to say that, as I was only an overseer, I did not have an opportunity to test my ideas, the mill preferring to hold these several hundred cases of goods and sell them at the price of seconds or even worse. During my stay at this mill few of these goods were shipped, so I presume few were sold. This experience happened some time ago, but while I am not arbitrary, yet I am still very much interested in what would have been the results if my suggestions had been carried out, and if any of my brother finishers have ever run across such an experience, I would like to know how they handled the proposition and to what end. If none have tried an idea similar to this one, I am anxious to know what some of the competent finishers think about it, and whether it would have worked or not.

Another experience I once had was with a superintendent who has made quite a record in the cotton mill world and is at present holding one of the most lucrative positions in the country and running his mill very successfully. This mill was making an abnormal amount of wrinkled goods; also goods allowed to run off the tenter hooks, as well as quite an amount of goods allowed to contract by the hot air under tentering machine while the machine was being stopped for various reasons. In this case I suggested that he have these goods run over in somewhat the same manner as the goods previously mentioned, but he dismissed the idea with a frown, saying it "can't be done." As I was not even an overseer at the time, and he did not ask for further information, I kept my own counsel, and I guess this mill is still cutting many dollars' worth of goods up into rags and seconds. I wish to know the opinion of other finishers on this proposition also.

Once upon a time I very much desired to unwind some very slick, hard-finished goods from "bolts," or, what may possibly be better understood, goods wound on boards, so as to fold them on yarding machines. This was quite a proposition to me. Every way I tried with the machines at hand the cloth would slip so badly on the roll that I found it almost impossible to fold it in a straight fold. I could have laid it in loose plaits, as mentioned in the first problem, but I had no such machine, and the management would not provide it. I solved this problem by carrying an equal number of "bolts" and rolls direct from the loom to my stitcher, and made them into larger rolls, sandwiching a bolt of finished goods, then a roll of unfinished. In this way I got very straight rolls, which I carried to my "folder" or "yarder," where I folded the entire roll, taking out the finished pieces and stacking the unfinished goods on trucks, with ends hanging out, which I restitched. This gave me the unfinished goods ready to run from the truck into the regular place in front of shearing machine. Was there a better or cheaper way I could have done this work with the machinery at hand?

One more question and I am done for this time at least. I was with a group of mill men standing near a book-folding machine, or what some may understand better as a doubling machine—a machine that puts cloth into double or treble folds to decrease the width of the package. One of the men, the superintendent of the mill in question, said if a fellow was to run a piece of goods not desired on this machine, that it would be ruined; that no power in heaven or elsewhere could ever put the piece as a whole back into single fold. I told him I thought he must be wrong, but as he seemed proud of his knowledge, and as quite a number of prominent men were present, I did not care to butt in further. Really, I had never tried the idea that came to me on the impulse of the moment, but when I was alone again I did try it in a way on one small piece by hand. My idea was simple. I reversed the machine, or, in other words, I went back to the front or feeding end and pulled a piece of goods off the bolt behind, allowing it to fall in a large box. By putting an improvised nip roll here in front of the feed or front end, why could I not remake "book fold" or doubled goods into single width goods again? Will it work, or is there some other and better way for doing it? Will someone tell me how they would handle such a proposition if it were to come up?

Finisher. (South Carolina.)

THE LOOM FIXER.

EDITOR COTTON:

How many men in the leading official positions in the mills know the real conditions of the mill inside? More especially the conditions under which the weave room operates? Do they know and try to remedy the weak parts?

A first class loom fixer is one of the most valuable assets of a mill, and these are the most scarce of any efficient help the mill uses. The woods are full of so-called loom fixers or those who claim to be loom fixers. But 75 per cent of them are not worth the space they take up in the weave room. I am now going to give some of the reasons why I think such conditions exist and the remedy.

In the first place a man to be a first-class loom fixer has to be mechanically inclined or talented, equipped with good common horse sense and with some energy and ambition to succeed. Loom fixing is a finished mechanical trade. It requires a lot of study and hard work to master the trade. When it is mastered, then there is no pay in it to justify an intelligent man to be contented and settle down on it for a livelihood.

In most mills weavers make as much or more than the fixers. For this reason you can not get the best material to learn to fix looms. The best material for this position is

young married men and they refuse to learn to fix looms for the simple reason that they can make more money at weaving than at fixing looms, and there is not enough in fixing to justify them giving up weaving and working for the small wages paid for learners.

The consequence of this is that you cannot get enough of the men, who would make good men, to learn to be fixers. The majority of those who want to learn are those who will butcher up the looms and make them run any old way by using a lot of supplies and making a large percentage of second quality cloth. The "take-it-easy" kind who want to sit around and wait for Sunday and pay day and get mad every time a weaver has a loom out of fix. Such a fixer goes to the loom mad and bluffing and the weavers get disgusted and run their looms in any old shape to keep from having him around. Such fixers do not know how to fix the looms. Do not know the principle of a loom and never will, for the simple reason that they have no talent, sense or ambition about them to want to learn. They learn to do some things by seeing others do them and manage to "botch" along and ruin the machinery and cloth.

To test a man as to whether he understands fixing looms, take him off of the loom he is used to working on and put him on another make of loom, weaving the same class of goods under the same conditions and if he understands the principles of a loom he will have no trouble, but if he does not and is one of these "imitations", look out for him to "holler": "I can't fix these looms; I learned on another kind of loom." I say if a man really knows one loom he knows them all, and if he doesn't know all he doesn't know any, and the mill company employing him is losing money on him at any price.

A loom is a loom, and all are intended to do the same thing, viz., weave cloth of some kind. It may be plain sheeting or fancy dress goods; made with cam shedding motion or dobby heads; in either case the principle is the same. The object is to open the warp yarn so the shuttle can pass through from one box to the other and carry the filling. The shuttle has to get in these boxes at certain times of the revolution of the crank shaft and the backward and forword motion of the lay. This is accomplished by the cam pick motion and if the harness cam and pick cams are timed right, the shuttle will go through the warp shed with very little chafing of the warp yarn. But even if these are timed right and the fixer does not set his harness right by properly adjusting the top and bottom straps, bad running warps and a high percentage of second quality cloth will be the result.

The loom fixers are not the only ones who are short on fixing quality. A majority of the second hands and even the weave room overseers are not capable of properly instructing young fixers, for the reason that they, themselves, do not know. The writer is a loom erector and has a chance to see the conditions in a lot of mills, and it is amazing to see the condition some mills are in for no other reason than because the men in charge of the looms, from overseers down to loom fixers, are totally ignorant of the main principles of fixing looms. Of course there are exceptions and there are a lot of good, competent overseers, but the most of them are handicapped by not being able to secure good loom fixers. Why? Because they don't exist, and the main reason is, as I have stated, they are too poorly paid to demand the good material that could really learn the trade. Erector. (Southern District.)

SOME CARD ROOM HINTS.

EDITOR COTTON:

Did any reader of this department ever visit a card room and find most the doffers covered with seed and leaf?

When I see such conditions existing in any mill, I blame the superintendent more than the carder. When seed, leaf and neps collect on the doffer, the flats are set too far away from the cylinder. Any mill man should know that. Still, in almost every print cloth mill you can find this evil.

Did any reader ever notice, also, streaks in the flats? What I mean is that the flats are charged with stock from ½ to 2 inches, thus forming what I call a streak. In almost every case this is due to the cylinder wire dipping into the flats at every revolution of the cylinder. When a lump of cotton, or a piece of material of a hard nature passes through the card it will in some instances raise the clothing which is termed blistered. When the clothing is raised from the cylinder, the wire will be forced to the cylinder shell by the action of the stock and cause the wire to lodge under the clothing. Therefore, forever after, the part blistered will dip into the flats and cause the streak in the flats as stated.

When a card is found in this condition, it should be immediately stopped and redrawn; that is the only proper way. However, it is not always convenient to stop a card owing to lack of production, and in such cases the trouble can be fixed temporarily by passing the wire knife under the clothing so as to work the wire points back into their places in the fillet. When all the wires have been forced back with the wire knife the fillet will lay as formerly on the cylinder shell, but of course in a loose condition. To eliminate the danger of the cylinder-wire dipping into the flats set the flats to .012 gauge until the opportunity offers to redraw the cylinder fillet. Practical. (Mass.)

A STUDY IN HUMAN NATURE.

EDITOR COTTON:

Some overseers differ from others as regards to the treatment of the help. For instance an overseer may discharge a person for any little bit of trouble or bad work, while others will try and correct this certain person in anything that may appear, that is if he or she does not know the job or is not doing it right. Here is an example:

There was a young man working in the same room with me and somehow or other, there were some ends to pull down on a frame that he was not supposed to have to pull down. Well, the argument between the operative and the section man got so hot that the second hand was notified. He in turn made the argument still hotter, which resulted in this twister tender getting so angry that he packed up and went home. That left the second hand without a good worker, as this man was well trained and had been on the job for a good many years.

The same day another man was hired, and as usual he went to work, but as soon as the frames started to run bad, he made one big rush for the door and did not return again. After a few weeks, trying over a dozen men, the second hand made up his mind to get the same man back to his section so that he could have it in good condition once more. He succeeded in getting him back again and things soon looked 95 per cent better than when he was away.

The moral of this story goes to show that if the second hands and overseers would correct the mistakes that some of the help do, and try to get them on the level again, they would never have to worry over the shortage of help, such as a speeder tender, a comber tender, a spinner, or any other kind of help that may be discouraged and not come in on account of things not working smoothly. I do not mean to knock every second and overseer, for some of them are good fellows, and it pays to work in a mill or any other place where there are good bosses.

There are some persons who can handle a pair of speeders or a section of spinning frames just like handling a plaything, while others work as hard as they can and will not accomplish anything worth while. This proves that when a man or a woman is on a certain kind of work for a good many years, it is hard to find someone else who can come in and do this work with the same ease, because it takes time and experience to get the frames, or whatever kind of work it may be, under control.

Whenever a second hand has a good worker, who knows the work thoroughly, I would advise him to keep such a worker as free from trouble as possible. Nothing suits an overseer better than to have his room full of good workers. It is a pleasure to look around such a room and see everything running in good condition. This means that an overseer can get a lot of work out of his help, and not have them feel the strain, but one who is always discharging people for any little thing that they do, should never hold a position among people. This hurts the reputation of the mill, for the work is not done right, the production very low, and the help constantly dropping off.

Lewis. (Mass.)

NEW MACHINERY AND TRADE NOTES.

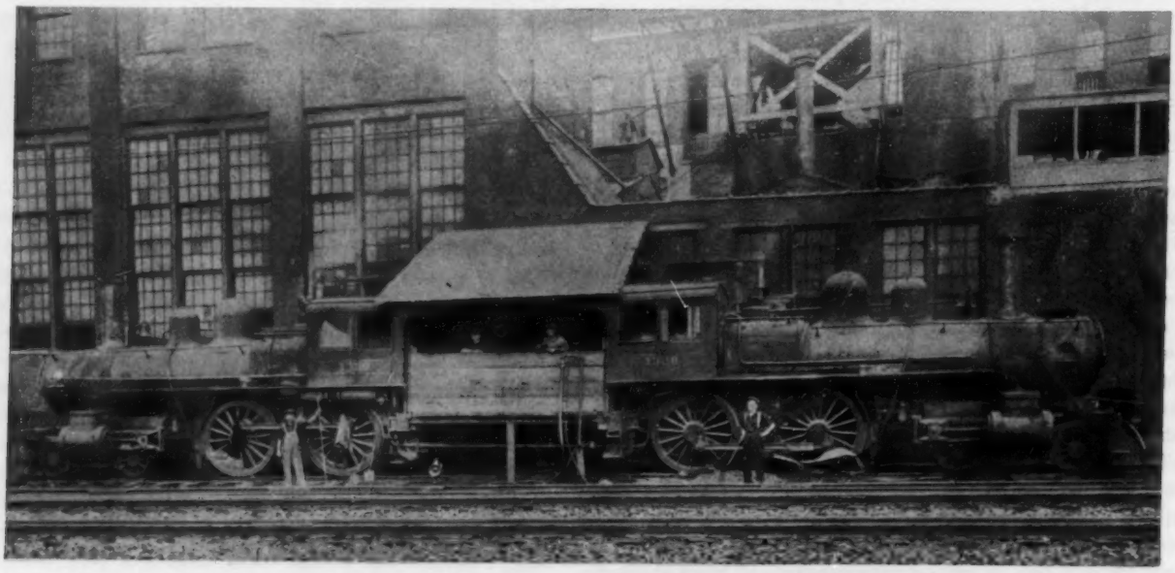
AN UNIQUE EMERGENCY PLANT.

When a manufacturing plant is confronted with the problem of replacing an old, inadequate battery of boilers with a new one of greater capacity, it is not a simple matter to make the change without interrupting operation.

This solution was met most ingeniously when it became necessary for Schaum & Uhlinger, Inc., of Philadelphia, Pa., fabricators of textile machinery and centrifugal hydro-extractors, to increase their source of power supply. An estimate from the local company showed electric power to be of prohibitive cost. The idea of utilizing locomotives for the purpose, while somewhat novel at first thought, bore the elements of sound judgment, as the location of the plant on the main line of the Pennsylvania Railroad made feasible the storage of locomotives on a long freight siding.

It remained a problem, however, to get locomotives of the proper capacity, for it is not difficult to obtain those with too much power, since the sizes of locomotives found on railroad "scrap heaps" in these days of heavy railroading have increased to a point where small engines are rather difficult to obtain.

Two "American" type locomotives were obtained from the Pennsylvania Railroad at a very reasonable rental. While these were doing service the old battery of two boilers was replaced with a 462 horsepower Heine boiler, stoker-fired by a Taylor automatic stoker of the five-retort type. The furnace is fitted with an extension grate, giving enough grate area to insure absolute combustion of the fuel, without having to have a brick arch. An American blower is used for forced draught.



The process of locomotive boiler substitution was simple, but effective. The two old locomotives, whose connecting rods and valve gears had long been disconnected, were hauled to a convenient point on the siding after their tenders had been uncoupled. Their throttle valves were closed and a connection piped from their auxiliary domes, over the fire boxes, to the main steam lines in the plant. Their positions, back to back, as shown in the illustration, with an elevated platform erected between them, allowed sufficient space for two firemen and a copious coal supply that could be replenished without interrupting the service.

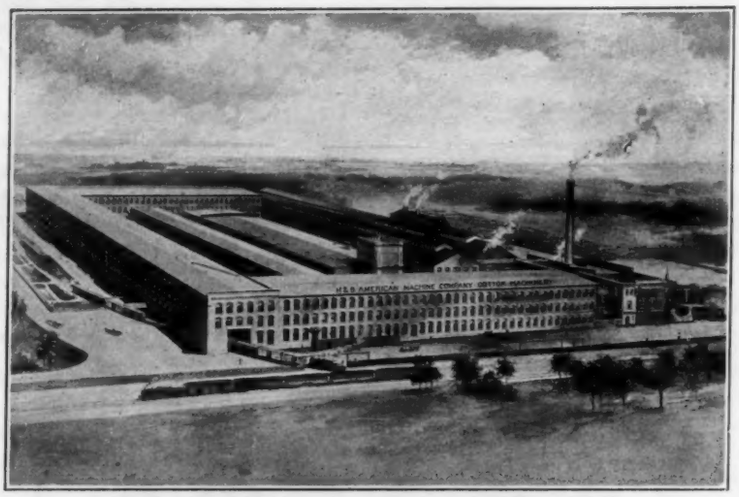
C. E. RILEY, Pres.
Boston Office
65 Franklin Street

Southern Offices
814-815 Empire Bldg.,
Atlanta, Ga.

COTTON MACHINERY

Opening and Picking Machinery

Card Room Machinery



Spinning Room Machinery

Twisters for Wet or Dry Work

With Band or Tape Drive

H. & B. AMERICAN MACHINE COMPANY

PAWTUCKET, R. I.

THE CASSELLA COLOR COMPANY, 182 Front Street, New York City, are forwarding to the trade the following color cards and samples: Brilliant Milling Blue, F. S. and F. G., and Orange G. R. special. These color cards also contain general dyeing directions, etc., of interest to practical dyers. They may be secured on application to the company.

THE BAYER COMPANY, INC., 117 Hudson Street, New York, are fordwarding to the trade the following color cards containing the directions for dyeing, the properties of the dye, and samples of materials dyed therewith: Katigen Cutch 5 R. L.; Fast Light Yellow G. G. N.; Acid Chrome Yellow G. L.; Algole Pink C. R. paste and powder; Katigen Brilliant Black F. G. Extra.

What kind of articles would you like to see in COTTON?

Which departments interest you most?

.....

.....

.....

Name.....

Address.....

Position .....

CUT OUT, FILL IN AND RETURN THIS BLANK.

Notice. Because of the time necessary to collect data, or locate some person peculiarly fitted to write on a subject, applicants must not expect to see subjects suggested appear in the next issue. They will, however, appear in due time.

THE DE LASKI-ROYLE CIRCULAR LOOM.

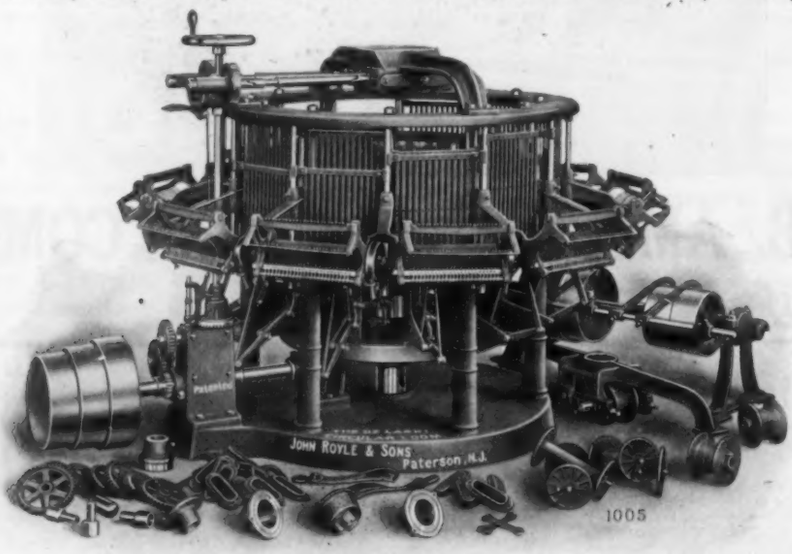
This machine has for its object the weaving of jackets for fire, steam and air-compressor hose, fabric coverings for cables, and other cylindrical weaving. Aside from the shuttle action, which is rotary instead of reciprocating, the principles of weaving applied in this loom are those common to all weaving machines. The two elements, warp and weft, are united to form the weave. The warp threads enter the machine through a series of alternating heddles, while the weft or filling is laid by a pair of rotary shuttles. The shuttle action is continuous, in one direction, thereby saving loss of time and momentum.

While embodying common principles, this loom is practically self-contained, and a departure from the ordinary in the taking of warp threads directly from the originally wound spools or tubes, which are placed upon some suitable form of creel. This permits the continuous weaving of indefinite lengths of hose, for when a spool runs out it can be immediately replaced. The creels are usually located beneath a gallery on which the loom is located, and the warp is passed up through floor plates to the several heddle sections of the loom. Because of its special construction, it is claimed that while the amount of finished material that it will deliver varies with the size and quality of yarn, diameter of hose, number of picks, etc., the output under ordinary working conditions ranges from 500 to 800 lineal feet in a ten-hour day.

In construction the frame consists of a heavy iron base plate with upright columns, supporting a series of four circular platforms or galleries. The lowest of these platforms, just above the base plate, carries actuating mechanism for operating the heddles, the second and third platforms carry the shuttles and shuttle guides, while the top plate completes the structure, supporting the take-off bridge and guarding the operator from contact with the working parts.

The heddles are arranged in pairs which encircle the upper part of the loom. There are twelve pairs in all, providing a maximum capacity for two hundred and twenty-eight threads of warp. The heddles are of strip steel, each strip being perforated to admit one warp thread. A pair consist of an inner and an outer heddle which alternately rise and fall, forming the sheds through which the shuttles pass in laying the filling. The heddle motion is derived from a unique combination of levers underneath operated by a cam wheel. From the heddles the warp passes directly to the weaving point at the center of the loom. The yarn passes through outboard tension devices, one of which is located opposite each pair of heddles. There are two shuttles, both of which travel continuously in one direction on a leathered circular track within the circle of heddles. They are guided by a fence consisting of two circular combs or grids, one above the other.

These shuttles pass between the sheds or warp in precise conformity with the heddle motion, the sheds reversing between the shuttles. Each complete revolution, therefore means two picks. Each shuttle carries a bobbin with capacity for about three pounds of cotton yarn, and when empty the bobbin can be quickly replaced with a full one. A suitable framework of steel bows forms a protective outline about the shuttle mechanism, insuring its smooth and uninterrupted passage between the warp threads. At the back of each shuttle is a curved rack, the teeth of which engage with gear driven pinions placed equi-distantly about the circumference of the loom. The rack is sufficiently long to be always in engagement with at least one pinion; thus the shuttle has a positive, continuous motion. Each shuttle travels on two wheels over the leathered track and has four pairs of horizontal wheels bearing on the guide combs. The wheels are nicely adjusted to avoid all needless friction. To give the filling proper tension, the bobbin is retarded by a tension device which automatically compensates for the varying diameter of the spool. The delivery portion of the shuttle is the spreader, a projecting arm which lays the filling at the weaving point between the parted sections of warp. Spreaders are made in different sizes, each suitable for a specified range of hose diameters.



THE DELASKI-ROYLE CIRCULAR LOOM.

United at the center of the loom are the two elements, warp and filling. The weaving is done either within a ring or around a pin, as a matter of choice, the size of hose being determined by the diameter of the ring or pin. These fixtures are made of all sizes within the capacity of the loom, which is from one-half inch single jacket to three

Barrett Specification Roofs

A Word to Architects, Engineers and Builders

After you have provided for foundations, steel structures, masonry, flooring, heating, wiring, and the thousand other things that demand your attention when planning for skyscraper, office building, factory or warehouse, you should "top off" the good work with a Barrett Specification Roof.

Your experience has taught you that metal roofings are very costly, both in first cost and for maintenance. They require painting every so often, and easily corrode under the action of smoke and acid fumes. Slate cannot, of course, be laid on a roof that is comparatively flat. A ready roofing is out of place on a first-class permanent building because of the danger of damage from leaks and because of the frequent paintings that make it by far the most costly you could use.

To anyone who will investigate the subject, it will be apparent that a Barrett Specification Roof is by far the most economical and satisfactory.

The five layers of Coal Tar Pitch insure its being *really waterproof,* the five plies of tarred felt give it strength and body, and the gravel or slag or tile which forms the wearing surface bears the brunt of the weather.

There are many cases of roofs built along lines of the Barrett Specification which are doing good service at the age of twenty or even thirty years without any expense for maintenance.

Underwriters always accord these roofs the base rate of insurance.

Send to our nearest office for a copy of The Barrett Specification in full. It specifies a roof which will always stand as a proof of your good judgment.

BARRETT MANUFACTURING COMPANY

New York, Chicago, Philadelphia, Boston, St. Louis, Kansas City, Cleveland, Cincinnati, Minneapolis, Pittsburgh, Seattle, Birmingham.

THE PATERSON MFG. CO., Limited—Montreal, Toronto, Winnipeg, Vancouver, St. John, N. B., Halifax, N. S., Sydney, N. S.

TRADE B MARK

Warehouse of Louisville Lead & Color Co., Louisville, Ky. Architects—McDonald & Dodd, Louisville, Ky. Roofers—J. L. Strassel Paint & Roofing Co., Louisville, Ky.

SPECIAL NOTE

We advise incorporating in plans the full wording of The Barrett Specification, in order to avoid any misunderstanding.

If any abbreviated form form is desired, however, the following is suggested:

ROOFING — Shall be a Barrett Specification Roof laid as directed in printed Specification, revised August 15, 1911, using the materials specified, subject to the inspection requirement.

and a half inch triple jacket. Weaving pins are interchangeable supported by a bridge-like weaving ring holder.

When it is desired to weave coverings about solid cores, cables, steam or compressed air hose, the material to be covered is passed upwards to the weaving point from beneath the loom gallery through the base plate and hollow central column of the machine.

The take-off rolls are supported by a bridge across the top of the loom between which the finished hose passes upward and away from the machine. These rolls operate in exact harmony with the rest of the loom, and grasp the fabric firmly, drawing it up from the weaving point as fast as it is woven. As regularly furnished the loom will weave from about five to twelve picks per inch, the corresponding variations in the speed of delivery being made by the use of change gears in the take-off mechanism.

There are ordinarily a pair of corrugated iron rolls used for the take-off. These rolls deliver the hose in a flattened condition suitable for winding on a drum. For taking off the product in tubular form, as when covering steam or compressed air hose or weaving about a cable, a pair of grooved rolls are substituted. These rolls have flanged iron hubs, designed to be filled circumferentially with rubber compound to make them conform to the hose in shape and size. The rubber also affords them a good gripping surface for drawing up the hose without injury.

The drive is used on all three motions of the loom, heddle, shuttle and take-off, by a horizontal shaft which enters the machine just above the base plate. This shaft receives its power from cone pulleys and an overhead countershaft. At the center of the loom is an upright revolving sleeve carrying a horizontal spur gear of large diameter, a cam wheel beneath and terminating at the lower end in a large bevel gear. This entire mechanism is driven by a bevel pinion at the inner end of the main driving shaft. Its function is to distribute power to the two main sections of the loom. The cam wheel notches into the heddle actuating mechanism, while the spur gear engages with the several pinions which drive the shuttle. A convenient lever permits throwing vertical shaft out of engagement, when the rolls may be turned, independent of the machine, by the hand wheel shown. The net weight of the machine is twenty-one hundred pounds.

For winding de Laski-Royle circular loom shuttle bobbins, there is a small auxiliary machine suitable for mounting on a bench or table. The empty bobbin is placed upon a horizontal revolving spindle and passing to and fro opposite the bobbin is a sliding carriage with an eye from which the yarn is delivered to the bobbin.

THE BERLIN ANILINE WORKS, 215 Water street, New York City, are forwarding to the trade the following color cards: Sulphur Dark Green B Extra; Sulphur Green 4 G K; and Sulphur Black Brown N Extra, N R Extra, and Olive B. These color cards contain dyeing recipes and other information of interest to dyers. They will be forwarded on request.

THE FARISH-STAFFORD COMPANY, commission merchants at 110 Worth street, New York City, announce the change of the corporation name to THE FARISH COMPANY. This is a change in name only and will in no way affect the business of the organization.

A DIFFERENCE IN METHODS.

In the January issue of COTTON appeared a review of a book on the German cotton industry. In commenting on the housing conditions of the German operatives, the author of this book stated the fact that tenants were compelled to keep the rooms, stirways, etc., of the premises occupied by them, clean, under the penalty of a fine. The American method of handling this question of neat housing conditions can perhaps be no better illustrated than by quoting the following circular, which was sent by the DRAPER COMPANY, of Hopedale, Mass., to each of its tenants in April, 1913:

TO THE TENANTS OF THE DRAPER COMPANY.

"The committee on yard prizes has had placed at its disposal the sum of $300, to be distributed for the year 1913 as follows among the tenants living in houses belonging to this company in Hopedale:

One first prize $10.00
Twelve second prizes .....$ 7.50 each
Forty third prizes .....$ 5.00 each

"These prizes will be awarded on the condition of the premises for the season, and the yards will be inspected by the committee from time to time.

"While shrubs and flowers will be given favorable consideration in judging the relative merits of competing tenements, a display of flowers will not offset a slackly kept lawn or an untidy back yard.

"Ashes and garbage will be carted away at the expense of the company as soon as practicable. After this cleaning has been done, tenants will make use of the garbage cans provided for the reception of decaying matter, and ashes may be thrown into the same receptacle. These cans will be emptied at the company's expense, as usual. After the final cleaning in the fall, ashes are not to be kept in the cans, and the cans are to be stored under cover.

"An additional sum of $75 will be distributed among the tenants of the company living in the houses on Prospect Heights, Milford. This sum may be reduced, depending upon the number of tenants occupying the premises during the season. It will be divided into first, second and third prizes, on about the same basis as the distribution above indicated among the other tenants. Prizes will be awarded in November."

These yard prizes were awarded on the pay-day before Thanksgiving, 1913, seventy prizes being divided among about 450 tenants.

It gives us pleasure to announce the copartnership in the cotton goods brokerage business of James White, doing business at 43 Leonard street, and Herbert W. Hunter, for many years with M. Heineman & Co. Commencing January 1, 1914, under the firm name of WHITE & HUNTER, they will conduct the business at 43 Leonard street, New York City.

THE GROSSER KNITTING MACHINE COMPANY, of New York, is sending out a calendar for 1914 which is an example of the printer's art. Those who are so fortunate as to receive a copy are likely to preserve it permanently by framing it. The beautiful picture, "An Old Romance," shows a charming maiden reading a book, the rich coloring of the artist's work losing nothing through the reproduction.

To the South Pole

with Captain Scott
and

To the North Pole

or thereabouts with
various other explorers

And to All Intermediate Points

has RU-BER-OID gone--
invariably doing what is
claimed for it.

22 YEARS OF SUCCESS
EVERYWHERE

RU-BER-OID
ROOFING

The Original is still unequaled
There is but one
RU-BER-OID

Pronounced "RU" as in "Ruby" and always spelled with one "B."
There is no rubber in the composition or pronunciation of RU-BER-OID.

KA-LOR-OID
(Colored Ruberoid)

is the same durable material with the added attraction of beautiful and permanent colors
TILE RED---COPPER GREEN
Send for samples

The Standard Paint Company

100 William Street, NEW YORK

BOOK REVIEWS

All Books Reviewed Under This Heading May Be Procured From COTTON at the Published Price.

A DICTIONARY OF APPLIED CHEMISTRY. By Dr. Edward Thorpe, C.B., LL.D., F.R.S., Professor of General Chemistry and Director of the Chemical Laboratories of the Imperial College of Science and Technology, South Kensington, London; late Principal of the Government Laboratory and a Past President of the Chemical Society and the Society of Chemical Industry. In five volumes. Revised and enlarged edition. Numerous illustrations. Published by Longmans, Green & Co., London, New York, Bombay and Calcutta. Price of each volume $13.50 net.

During the past year we have announced from time to time the appearance of the first four volumes of this series from the presses of the publishers. Volume 5 is now ready for distribution and completes the list of chemical subjects discussed from Sodium to Zymurgy. From the viewpoint of a practical chemist, the research student, and to all others who in the course of their daily labors have contact with chemicals and chemical terms, these five volumes form an encyclopedia of information unobtainable elsewhere.

The subjects discussed in this valuable work are presented so thoroughly and with such great accuracy that even the minute details desired by the investigator are to be found. Take starch for example. The subject of starch occupies approximately 40 pages out of the 830 pages that form this fifth volume of the dictionary. The author subdivides the subject into 33 parts in the order given as follows: Occurrence; Nomenclature; Physical characteristics; Formation of starch in a living plant; Structure of starch granules; Chemical properties; Action of heat; Action of hot water; Soluble starch; Action of alkalis; Action of acids; Action of chlorine, bromine, and iodine; Action of other reagents; Action of enzymes; History of starch transformation; Action of bacteria; General considerations of manufacture; Manufacture of starch from wheat; Manufacture of starch from potatoes; Manufacture of starch from rice; Manufacture of starch from maize; Manufacture of starches for edible purposes; Corn flour; Arrowroot starch; Cassava starch; Curcuma starch; Arum starch; *Tous-les mois;* Sago; Inulin; Litchen starch; Glycogen; and The Detection of Starch existing in a solid state in any substance.

Other subjects are treated in an equally thorough manner and the series as a whole is invaluable as a work for reference purposes. The laboratory library of no large plant is complete without this valuable aid to its chief chemist.

THE ECONOMICAL AND SUCCESSFUL MANAGEMENT OF COTTON MILLS. By Henry D. Martin. 220 pages. Numerous illustrations and drawings. Published by the author. Price $1.50.

The thoughtful manufacturer hardly needs an introduction to this book. In many instances he already knows the author. He also knows the value of the various points of economy which the author takes up in this work which is intended to be a handbook giving practical talks on practical subjects. This work was prepared from a cotton manufacturer's standpoint and consists largely of reprinted and revised articles which have appeared from time to time in various trade papers as contributed by the author. A few of the chapter headings are entitled: "The Practical man in the cotton mills; The value of reading the textile papers; How to get the job; How to straighten out a cotton mill; How to be an ideal loom fixer; How to prevent fires; Costly experiences prevented; Office training; and many others. One of the chapter headings which will appeal to many readers of COTTON is entitled "The work of the cotton mill superintendent," which deals particularly with the office end of the superintendent's work and the various reports and figures which he has to consider.

PROGRESS AND PROFIT FOR MILL MEN. By Henry D. Martin, 212 pages. Published by the author. Price $1.00.

This book, as in the case of its predecessor, is compiled largely of revised and rewritten articles formerly published in the trade press of the country and also from addresses presented before the National Association of Cotton Manufacturers. It is a book intended for all classes of mill men who want to show better results from their departments and rise thereby in the estimation of their employers. There are chapters on special sections of cotton manufacturing economy, floor space economy, the mill man's salary, how to save power, system and success, how to maintain weaving production; some new figures on spindle banding and many other similar subjects. Mr. Martin's books make a convenient and valuable addition to the library shelves of any practical mill man who may desire at times to refer to the experiences of others and compare their methods and results on problems similar to his own.

SAFETY. Methods for preventing occupational and other accidents and diseases. By William H. Tolman, Ph. D. Director of the American Museum of Safety, and Leonard B. Kendall, 422 pages. Numerous illustrations and diagrams. Published by Harper & Bros., New York and London. Price $3.00 net.

Year by year the questions of safety, sanitation and social welfare among the workers are attracting more and more attention from the employers. This is so in one class because it is becoming more and more thoroughly understood that the physical well-being of the operatives is an asset of great value to the employer, while another class of employers are considering these same results, not so much from the standpoint of indirect personal prosperity as in the former case, but because these are employers unable to take this broad view of the industrial situation and so have been practically forced into the making of these necessary reforms by legislative enactment along the lines of workmen's compensation laws, etc.

A good many manufacturers, or their active managers have thoughtfully considered these subjects, which in practically every case have a special application for each plant and a great many safeguards which might be devised by one manager to apply to his particular plant would be useless in the plant of another. Therefore, such managers and manufacturers have looked forward with interest to any informative articles which might appear in the various magazines or periodicals which chance to fall into their hands. Such men as these will, therefore, be gratified to learn of Dr. Tolman's new book on safety, which is the

GLENLYON DYE WORKS

(Yarn Dept.)

CENTRAL FALLS, R. I.

FRANK A. SAYLES, Lessee

Bleachers and Dyers

OF

Cotton Yarns in Bal-warps and Skeins, Silk and Viscose Silk

SPECIALTIES: COLORS FAST TO BLEACHING, Mercerizing, Laundering, Cross Dyeing and Light. Dyed Novelty Effects in Fast Colors. High Grade Bleaching of Cotton Warps and Skeins. Silk Dyed Fast to Boiling Off and Bleaching.

Insist on Having

"GLENLYON DYED YARNS"

Safest and Most Reliable in the Market.

Write for Shade Card, Information and Guarantee.

May We Send You This Book Free?

It's brimful of helpful ideas on roofing of all kinds—wood, tin, tile, slate.

The 1914 edition of "Concerning That Roof" is a book that should be in your hands, because it gives vital facts about materials—the effect of fire, water, the elements, and the flight of time.

Cortright Metal Shingles

are the best for operatives' modest dwellings, or the most elaborate homes, because they're on the job without repair expense, as long as the building stands.

If one cottage catches fire, even in a high wind, the other roofs are safe from sparks.

The Cortright perfect overlapping and interlocking features permit expansion and contraction, but bar out rain and sleet.

"Concerning That Roof" tells you why—Send for it now.

Cortright Metal Roofing Co.

PHILADELPHIA AND CHICAGO

The "1912" Cloth Cutting, Folding and Winding Machine

This machine will cut down operating expenses. It does in one operation the work which is now being done in two. Is cuts the cloth, folds the edges and rolls them up in one operation, and at all times gets one more strip out of a bolt of cloth than is possible with the old method of cutting. At the same time it measures the bolt of cloth to show the manufacturer whether or not he is getting the number of yards he is paying for. With the high price of cotton to-day every knit goods manufacturer ought to look into this to see if he is getting the maximum efficiency at the least expense. You will find when you come to figure it up in the course of a year that the labor it saves is a big item.

Also have other labor-saving devices and upon application you can get prices, and full information on same.

J. A. FIRSCHING, 50 John St., Utica, N.Y., U.S.A.

Clinton H. Scovell & Company

Certified Public Accountants
Industrial Engineers

40 Central Street, - - Boston, Mass.

Specialists in Textile Cost Accounting

A Softener of Merit After years of study and experiment we have perfected a softener which has been tested, used and pronounced perfect by some of the largest and most expert manufacturers in the world.

PUX SOFTENER

has no equal. It leaves a fine heavy finish and clothy feeling, a beautiful silk lustre and at the same time gives the goods a soft and mellow feel. It is not a soap, and is far superior to Cocoanut Oil on the rollers.

STANDARD SOAP CO., - - Camden, N. J.

FOR

SCOURING—WASHING

There is nothing which gives you the soft, harmless, thorough and low-priced results of

Alumina Soapalite

THE MINERAL SOAP

The Electric Smelting & Aluminum Co.

LOCKPORT, N. Y. Sole Manufacturers

A COMPLETE CATALOG

TEXTILE BOOKS

will be mailed on request.

Cotton Publishing Co., Atlanta, Ga.

only comprehensive work on safety that has yet appeared in the English language. It is a handbook of practical information for every one interested in the industry. It shows how big business can be good business in surrounding the workers with adequate safeguards to protect them while at work and in promoting the essential industrial hygiene. While the subject of accident prevention and shop hygiene has been treated in a broad way, the treatment has necessarily been limited to include only those features common to the majority of plants. However, many of the examples given might be applied in local cases and untold good will no doubt result from the hundreds of suggestive thoughts which the descriptions given by the author will bring up in the minds of the readers of this work.

The author devotes the first chapter to the philosophy of safety. In all the talk of efficiency which is spreading over the country, experts overlook the human element, we are told. Efficiency which confines itself merely with speeding up the man so as to approximate the precision of the machine, preferring one motion where there were two before, will more and more tend to make the man of not much more value than the cog on the wheel. True efficiency must rest on accident prevention, improved hygiene and mutuality. Waste in any form is a drag. It eats steadily into the credit side of the ledger. Loss of life, injury or even a temporary illness of an employe is waste—dollars lost not merely from the minor viewpoint of the payroll, but from the much more important side of cooperation and public opinion. We are impressed with the writer's belief that not only is this waste caused by preventable accidents within the factory, but also from hygienic causes. The ventilation, heating, lighting, dust removal and water supply should receive the same care and consideration as in the most sanitary dwellings. Numerous examples are given to prove the value of securing a pure and permanent water supply for the use of the operatives.

The second chapter is devoted to what is termed "Neglected factors" and under this head contains some very pertinent suggestions which are applicable in many manufacturing plants employing operatives.

Considering the fact that the great majority of wage earners spend at least one-third of every twenty-four hours in factory, mill or shop, the working place is of prime importance, not only from the viewpoint of the employe, but also from that of the employer. Therefore the author has devoted his third chapter entitled "The Working Place," to presenting the fundamentals of safety in the widest interpretation in so far as they relate to any place where work is being done. Detailed features of this subject are to be found in chapters four and five, which concerns special trades and occupations.

In chapter six, the question of illumination and its intimate relation to modern industrial processes is discussed. Following this is a chapter on fire prevention, with details concerning fire drills, fire escapes, fire signals and kindred subjects.

Another subject on which the author devoted an entire chapter is that of safety committees. These safety committees or plant committees, as they are sometimes called, are made up of superintendents, assistant superintendents, master mechanics and safety inspectors. They hold weekly meetings at some plants and in other larger plants, daily meetings. They discuss operating questions, safety matters, proposed safety devices and accidents which have occurred since their meeting. Frequently also there is a workmen's committee to cooperate with the committee named. As an example of the work of committees of this character, the author cites the committees of safety of the Pennsylvania Railroad, which reduced the serious shop accidents 63 per cent through the work of this committee. Separate chapters are devoted to iron and steel, mines and mining, and electricity. In a chapter entitled "General Aids to Safety," there are many worth while suggestions, and in another chapter there is detailed a brief history of the organized effort which has been made by employers in America to promote better working conditions in industrial trades.

Part Three of the book is devoted to industrial hygiene, and contains chapters on sanitation committees, and their work; industrial poisons and methods for providing for the operatives' protection; dangers to be avoided in chemical industries, and shop sanitation.

Part Four is devoted entirely to the social welfare of the work people, and contains many hints and suggestions along the lines now being adopted by cotton manufacturers. The subject of industrial education is given very complete treatment, as is the subject of training future workers for the industry. In chapters entitled "Something more than wages" and "After Hours," the author deals with subjects which are very close to the cotton manufacturer and the surroundings which he provides for his operatives. It is a book which will be well received and thoroughly appreciated by all managers who are taking a broad and modern viewpoint on the industrial situation.

CLARK'S DIRECTORY OF SOUTHERN COTTON MILLS. Edition of January, 1914. 136 Pages. Price $1.00. Published by the Clark Publishing Company, Charlotte, N. C.

This fifth edition of Clark's Directory contains accurate data relative to the cotton mills of the South. It does not include knitting or woolen mills, except those spinning cotton. It is equipped in the back with two folding maps and also with an alphabetical index of the mills. It is of pocket size and therefore convenient for ready reference.

THE MASON MACHINE WORKS, of Tatum, Mass., builders of cotton mill machinery, are distributing through Edwin Howard, their Southern agent, with offices at Greenville, S. C., a very neat leather bound vest-pocket note book for 1914. This note book not only contains the usual blank pages for memorandum purposes, but also contains interesting tables for cotton mill men that will prove handy and convenient in the every day work of cotton manufacturers.

A reliable belt dressing is one which will keep the belts soft and pliable; which contains no rosin and will not gum or glaze on the belt surface; one which is easily applied; one which prevents slipping; and one which will work with equal efficiency on leather, rubber or canvas belts. The ALBANY SAND & SUPPLY COMPANY, of Albany, N. Y., are distributors of "The Original Stephenson Uneed-a-bar Belt Dressing," which is put up in oval bars of one pound each, covered with waxed paper and a thin label. They claim for this belt dressing all the good points outlined, and will send samples or ship a trial order subject to approval.

This flashlight photograph, taken in one of the Clinchfield Mines in Southwestern Virginia, shows the second step in the mining of coal by improved methods. The seam has been "under-cut" just above the floor to a depth of 5½ feet by an electric mining machine and light charges of powder will be touched off in the holes that are being drilled. The disintegrating effects of dynamite blasting are thus entirely avoided, and the coal comes down in large, clean lumps, possessing all of their native hardness and firmness of texture. To provide such working places for a large number of men, miles of entries (tunnels) had to be driven at enormous cost.

FOURTH NATIONAL TEXTILE SHOW.

The fourth national textile exhibition to be held in Mechanics' building, Boston, April 27 to May 2, 1914, is arousing much interest in the textile circles throughout the country. Although the time of the exhibition is still two months away, more than three-fourths of the available space of approximately 125,000 square feet has been sold.

The remarkable growth of the textile exhibitions as compared with the original show which was held in 1909 demonstrates beyond question the value of bringing the prospective customer face to face with the newest and best developments in machines and processes for improving mill conditions and mill products.

This increased interest did not spring up over night, but is due to the untiring efforts of the members of the Textile Exhibitors' Association, under whose auspices each of the exhibitions have been held.

The Textile Exhibitors' Association was formed in 1908 for the purpose of conducting exhibitions at such times as the trade demanded. Plans were also made whereby the various textile organizations could hold their meetings and conventions in the same building during the week of the exhibition. These plans have been carried out at each show, and the results have been beneficial to both the exhibitors and the members of the visiting associations.

The first exhibition of textile machinery and supplies promoted by the association was held in Mechanics' building, Boston, in 1909. Although two years previous to this a similar exhibition had been held in Philadelphia, the Boston show was really the first textile exhibition that attracted national attention. There were about seventy exhibitors at this show, occupying an area of approximately 10,000 square feet. The display was very representative of the trade at that time, and the success of each exhibitor was so great that it was voted to hold a second exhibition the following year.

The 1910 exhibition, as was expected, proved even more successful than that of 1909. The number of manufacturers who exhibited jumped from 70 to about 125. At the close of this exhibition, although many requests were made to hold the shows annually, the association decided that an exhibition every two years would in the end meet with popular favor.

Accordingly, the third national textile exhibition was held in 1912, and in connection with it the first power show, under the auspices of the New England Association of Commercial Engineers. Twenty-five thousand square feet of exhibition space was required to house the displays of the 190 exhibitors who showed their products. This exhibition is so recent that its success is still remembered and has resulted in the association using the entire Mechanics' building, with its 125,000 square feet, for the fourth national textile exhibition, which is to be held in April. The power department, which proved such a successful and interesting feature of the last show, will have a special section reserved for this purpose at the coming exhibition. General Manager Chester I. Campbell will gladly furnish any information that may be desired if addressed at the executive offices at 5 Park Square, Boston.

A HANDY DESK CALENDAR.

A very interesting and valuable holiday souvenir was sent out to his friends and customers by Edwin Howard, of Greenville, S. C., Southern agent for the Mason Machine Works, manufacturers of cotton mill machinery of Taunton, Mass. This was a leather covered desk calendar with removable cards. The bottom of the calendar forms a box which contains a block of blank memorandum slips which may be removed one by one as they are required by the user. This calendar will make a useful ornament for the desk of the busy manufacturer and is directly in line with the thoughtful consideration always exercised by Mr. Howard in dealing with his customers.

Any textile manufacturer looking for improvements in sizing and finishing or meeting with difficulty in this respect will find it worth while to write to THE ARABOL MFG. Co., 100 William street, New York City. Scientific specialization, long and extended experience, modern equipment in factory and laboratory have prepared them to cope with every condition. Their progressive spirit, which makes them continually increase their staples, has given valuable assistance to the advancement of American textile manufacturing.

MILL NEWS

Notices of mill projects, additions or improvements are solicited for this department. Other notices pertaining particularly to the Southeastern section will be found in the Southern Mill Situation review.

ILLINOIS.

CHICAGO. It is reported that the Childs Welfare Garment Co., which manufactures infants knit goods at 2445 Lincoln Ave., contemplates the erection of a new mill building.

CHICAGO. The Lorenz Knit Goods Mfg., Co., Inc., has built an addition to its plant, adding one story on the present two-story building 50 x 120 feet and an addition of four stories adjoining 50 x 50 feet. This company has increased its capital stock from $125,000 to $200,0000.

MARYLAND.

BALTIMORE. Elmore Deibert, Frank T. Whitney, Jacob Wilson, W. Scott Deibert and Edward Deibert, of Elkton, plan the organization of a company capitalized at $75,000 to build a cotton cloth weaving mill. Their plans include the erection of a two-story building, 20 x 40 feet.

MICHIGAN.

ADRIAN. The Adrian Knitting Co., during the past year has increased its equipment by a 200 horsepower Hamilton-Corliss engine; a 200 Kw. generator and boiler; a four set spinning plant for the manufacture of waste yarns; a new store house; and several improvements to branch plants of this company located at Jacksonville, Fla., and Burr Oak, Mich.

MINNESOTA.

MINNEAPOLIS. The Lake Street Knitting Works, at 1705 East Lake St., have started the manufacture of sweater coats and jackets.

NEW JERSEY.

PATERSON. Morris & Company, Groverville, have been incorporated at $200,000 capital stock to manufacture and deal in cotton duck. John L Kuser, William McK. Morris and Edwin J. Morris have incorporated the concern, which takes over the former concern of the same name.

NEW YORK.

ALBANY. The McLaren Knitting Co., Hudson, has increased its capital from $10,000 to $125,000.

ALBANY. The Roff Underwear Co. has resumed operations in its factory at Green Island that the company had planned to abandon. The change of plan was due to the recent fire at the Atlantic Mill in Cohoes. The local factory will not be moved to Cohoes until the plant there is repaired and in good running order.

LITTLE FALLS. The Phoenix Underwear Co., will place in operation in its power house a new 625 K.v.a. alternating current generator for power purposes.

PENNSYLVANIA.

WILLIAMSPORT. Negotiations are underway for starting up the knitting mill at this place under new management. Hosiery manufacturers have looked over the plant and it is understood that one is ready to take it as soon as matters are adjusted.